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NUTRITIONAL PROBLEMS AND POLICY IN TANZANIA

by Olyvia Mgaza

Cornell International Nutrition
Monograph Series
Number 7 (1980)

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PREFACE

This Monograph provides a review of food and nutrition problems in Tanzania, and a discussion of policies designed to deal with these. The author, Olyvia Mgaza, is a young Tanzanian who is singularly well placed to write about these issues. She has an honours degree in the biological sciences from the University of Dar-es-Salaam, a Diploma in Food Science and Nutrition from the Catholic University of Louvain in Belgium, and now a Masters degree from Cornell University. She is a senior staff member of the Tanzania Food and Nutrition Centre (TFNC).

TFNC was established in 1973 by an Act of the Tanzanian Parliament. The Director of TFNC since its establishment has been Dr. T. N. Maletnlema. Under his wise and dedicated leadership it has developed into a strong institution with a wide variety of activities in applied programs, in research, in training and in policy formulation.

Tanzania is an extremely poor nation, and despite wise and imaginative leadership in the years since independence, she still has enormous problems. No statesman in the world today commands more widespread respect than does President Julius Nyerere of Tanzania. As a "mwalimu" (teacher) he has guided his young nation through the Scylla of the competing ideologies of East and West, and the Charybdis of a world economic system favoring the rich industrialized countries. His intelligence, his personal integrity, his willingness to innovate, and his concern for the poor of Africa are acknowledged by almost everybody, even those foreigners who oppose his socialist ideals and who are critical of what they consider his economic failures. But few question his morality and his dedication to humane solutions for difficult problems. I feel proud to have worked for several years for President Nyerere's government and honoured to have known this giant among men.

But despite enlightened leadership Tanzania remains among the poorest countries in the world. She has enormous problems to overcome. As is the case of many other developing nations, many of the economic difficulties are influenced by external factors, such as oil prices, which are beyond the control of their own governments.

The present Monograph illustrates well that there are still major problems of food production, food demand and food equity in Tanzania. These all contribute to the serious nutritional problems that are described here, and especially to protein-energy malnutrition. This publication breaks new ground by describing the existing mechanisms established for dealing with these food and nutrition problems, and by a detailed discussion on some possible directions that might be taken to solve them in the future.

Olyvia Mgaza spent the 1978-79 academic year with us as a graduate student in the Program in International Nutrition at Cornell University.

During her year in the Division of Nutritional Sciences she endeared herself to the faculty and students. She surely gave more to the Program than she took away. She inspired all who came in contact with her and served as a fine ambassador for TFNC and for Tanzania. Her intelligence, her charm and her humanity were an inspiration.

We are pleased to be able to publish this Monograph which is based on the work for her MPS(ID) degree at Cornell University. The purposes of the Monograph Series are to provide a vehicle for worthwhile papers that are too long for publication in most journals; to serve as a forum for authors to cover topics of broad interest to those concerned with international nutrition problems; and to make available at reasonable cost Monographs which deal with important nutritional problems and which discuss their solution. These publications are designed to be useful to students and practitioners, both in the industrialized and the non-industrialized countries, who share a real commitment to work to improve the quality of life of the poor and the underprivileged.

Michael C. Latham, M.D., Editor
Professor of International Nutrition
Cornell University

ABSTRACT

Available information on food supplies and nutritional problems in Tanzania have been studied and are presented. This clearly shows that the country faces nutritional problems of which PEM is the most serious and requires priority action. Iron deficiency anemia, goitre and vitamin A deficiency are also prevalent.

Current data show that the food supply situation is improving after the low production levels of the early 1970's. These gross availabilities are however no cause for relaxation as it is well understood that there is maldistribution at all levels.

The complex aetiology of nutritional problems does not offer easy solutions. A review of various national policies shows that there is scope for nutritional improvement. Agriculture is geared toward food self-sufficiency, the health care system is rural based and emphasizes disease prevention, and income policies attempt to reduce large disparities in incomes at the same time as raising income levels. In order to achieve rapid improvements in nutrition it is suggested that a more coordinated approach is required for which a national food and nutrition policy is necessary. This approach has already been adapted in Tanzania. Efforts should, however, continue to place emphasis on the role of nutrition in overall development such that all sectors recognize their potential contribution to nutritional improvement.

ACKNOWLEDGEMENTS

I was privileged, while at Cornell University, to have Dr. Michael Latham, Professor of International Nutrition, as Chairman of my Special Committee. His working experience in Tanzania and the close contact he has kept with the country's development have been most valuable. I am most thankful to him for being a constant resource person while developing the ideas for this study. His encouragement was very inspiring and he selflessly dedicated part of his valuable time to reading the drafts of this paper. Lani and Michael Latham made my stay in Ithaca a very pleasant and gratifying experience. I would also like to thank Erik Thorbecke, H. E. Babcock Professor of Economics and Food Economics, who served on my committee and provided guidance and a deep insight into this work.

I am most indebted to several people in Tanzania who helped in various ways in preparation of this paper: Dr. T. N. Maletnlema and Dr. Urban Jonsson for their useful suggestions, members of the Tanzania Food and Nutrition Centre staff and friends for securing the most needed reports and publications. Without their cooperation this study would not have materialised.

My studies at Cornell University were made possible through the financial support of the Tanzania Food and Nutrition Centre to whom I am most grateful. I also thank Mrs. Doreen Doty who painstakingly typed this monograph under a tight time schedule. My heartfelt appreciation goes most especially to my husband, Steven, for his encouragement, support, cooperation and patience during this period of study and work.

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INTRODUCTION

Inadequate diets, poverty, malnutrition and ill-health characterize most of the developing world today. It has been estimated that between 400-849 million people in the world may be suffering from malnutrition (Reutlinger and Selowsky, 1976; FAO, 1977).

Although malnutrition has been widely recognized as a serious problem among low income groups in developing countries, the improvement of nutrition has gained ground slowly in recent years. Development strategies have continued to place emphasis on increasing output, and GNP has been used as an indicator of economic development. Because the poor have been bypassed by growth, even where strategies have been successful in raising average incomes they have failed to reduce poverty. Malnutrition seen as a health problem, has been attacked using mainly curative methods and results have been disappointing because only the symptoms were attacked, while few efforts were directed at the basic underlying causes.

As pointed out by Hakim and Solimano (1976), the late 1950's started the era of Applied Nutrition Programmes which represented the first serious approach to the involvement and coordination of agriculture, health and education. Many of these programmes, however, did not fulfill their expectations because they were formulated in isolation outside development plans and they did not receive adequate support. New approaches are now being tried that call for more integrated efforts between the various sectors. Various meetings and conferences have explored the place of nutrition in planning for national development (Berg, Scrimshaw and Call, Eds., 1973). The dissatisfaction of the use of GNP as an indicator of welfare has led to the consideration of health, low mortality and education as indicators of welfare in their own right in the interpretation of economic performance (Selowsky, 1978).

Tanzania is one country facing very serious problems of inadequate food intakes. Protein Energy Malnutrition (PEM) has been recognized as a serious problem in the country and up to 30% of children under the age of five years suffer from its various forms. Endemic goitre, nutritional anaemia and vitamin A deficiency affect a large number of people. PEM may be the most serious problem requiring priority action, but all other forms of malnutrition even if insignificant at the national level are serious problems to the individuals affected and therefore require attention. At the early stages of nutrition activities in Tanzania, it had been recognized that sufficient food and good nutrition for the working sector of the population was essential for increased work output, consequently better diets for the labour force in plantations, mining, industry and prisons were needed for them to work more and produce more (Mohamed and McKeag, 1970; TNSRC, 1975; Maletnlema, 1977). Attention was later directed to children and other groups of the population. As in other places, efforts to tackle the problem of malnutrition were piece-meal and

dealt mainly with the manifestly chronic disorders by treatment of the sick. Today, Tanzania places emphasis on prevention of disease and eradication of poverty. Improvement in the quality of life is a national goal. Nutrition improvement has been accepted as a priority in development and the government has adopted an integrated approach for the solution of nutrition problems. One of the essential elements of such efforts is to have a well defined national policy for food and nutrition, which is in the process of formulation.

Policy formulation faces the need of available, systematized data that can offer a description of the prevailing situation in the country. The main purpose of this study is to put together available information and describe it in such a way that an understanding of the current food and nutrition situation of the country can be obtained. This is intended to compliment the present efforts of the Tanzania Food and Nutrition Centre which now produces a data report on food and nutrition every five years. The need for a National Food and Nutrition Policy has been discussed and a review of present national policies and their possible impact on nutrition examined. Emphasis has been placed on the current Five Year Plan which ends in June 1981. This may provide insights for the coming programmes on the possible contribution of national policies to nutritional improvement. This has enabled the author to study in detail various policy documents which allowed a deeper appreciation of the magnitude of the problem and the need for a more concerted effort toward the eradication of malnutrition in Tanzania.

The main problem has been the use of information that has already been collected and appears in numerous reports. The statistics are scattered and are not always consistent.

BACKGROUND

This section is included to provide the economic, social and political setting within which the nutritional problems of the country will be discussed. It is kept brief because most of the issues will be taken up again particularly in the discussion of the implications of government policy on nutrition.

Geography/Ecology

Tanzania is a tropical country lying immediately south of the Equator 3^{o}-12^{o}S. on the East coast of Africa. With a total area of 919,580 square kilometres it is bounded by the Indian Ocean on the East and has inland water bodies on all its other borders--Lake Victoria to the North, Lake Tanganyika to the West, and Lake Nyasa to the South. The country shares borders with eight other African countries. These are Kenya and Uganda (North), Rwanda and Burundi (Northwest), Zaire (West), Zambia and Malawi (Southwest) and Mozambique (South) (see Map 1).

Map 1. Tanzania and her Neighbours

• Regional Headquarters

The altitude rises from sea level to 19,340 feet, the height of Mt. Kilimanjaro, the highest point in Africa. With such a variation in altitude there are great differences in climate and vegetation. Some parts of the country are semi-arid with dry weather and a poor, often unreliable, rainfall, while other areas may enjoy a relatively temperate climate for part of the year. Annual rainfall ranges are from 250 mm to 1250 mm. Generally the climate and soil conditions are favorable for productive agriculture. However, only twenty percent of the land has been classified as suitable for crop production on a sustained basis. Twenty-three percent of the country is rangeland suitable for animal grazing, forty percent is tse-tse fly infested and thus rendered idle for any kind of production. Forests cover up to ten percent, and eight percent of the land area is set aside as game reserves or national parks.

Political

The United Republic of Tanzania is made up of mainland Tanzania (formerly Tanganyika) and the Islands of Zanzibar and Pemba. Tanganyika was under German colonial rule from 1880 to 1919. After World War I it was placed under British jurisdiction by a League of Nations Mandate in 1919 and the British ruled the country up to the time of independence in 1961. Tanganyika became a Republic in December 1962. TANU (Tanganyika African National Union) was the political party that led the country to independence. Zanzibar, on the other hand, was a Sultanate until the revolution in 1964, and its political party was the Afro-Shiraz Party (ASP). In April 1964, Tanganyika and Zanzibar merged to form the United Republic of Tanzania. Although there was a Union government, Zanzibar maintained a local government and the islands and mainland kept their political parties. An important and memorable event during the celebration of the Tenth Anniversary of the Arusha Declaration was the dissolution of TANU and ASP and the formation of a vanguard party CCM (Chama Cha Mapinduzi), which was really a merging of the two former parties.

The Tanzania mainland is organized into twenty administrative cum political regions each further subdivided into districts, divisions, wards and on to villages. The smallest unit is a group of ten houses called cells. Such organization is necessary to foster greater participation from the grassroots level.

In July 1972 the country decentralized its administrative/government structure, giving more power and autonomy to the regions. This was designed to increase both government response to rural local development needs and also efficiency of operation.

Demography

Tanzania had its first post-independence population census in 1967 at which time the population was 11.9 million. The second population census was in August 1978 and pre-census estimates put

the population at about 16 million people. The average national population density is 15 persons per square kilometre with ranges from 1 to 220 people per square kilometre. The following demographic parameters were applicable for 1973:

Total fertility rate	-	6.2 percent
Crude birth rate	-	45.6 per thousand
Crude death rate	-	17.7 per thousand
Natural rate of increase	-	27.9 per thousand
Infant mortality rate	-	152 per thousand
Life expectancy at birth	-	47 years

From the 1967 census data, I estimate the vulnerable group to be more than forty-two percent of the total population that is children up to five years of age, and women in child-bearing age. These are vulnerable primarily because of their relatively great nutritional needs. In pregnancy there is growth of both the foetus and maternal tissues; and childhood is a period of rapid growth. During lactation the mother needs to be well-nourished to produce sufficient quantities of milk. During these critical periods both good diet and a favourable socioeconomic environment are important.

The Economy

According to current classification criteria Tanzania is a "least developed country" with per capita income of less than $200. The FAO Fourth World Food Survey-1977, ranks the country as most seriously affected in terms of facing serious problems of inadequate food intake.

Tanzania relies mainly on agriculture as a source of both revenue and employment. Most of Tanzania's exports are in the form of agricultural primary commodities--sisal, tea, coffee, cotton, with increased emphasis now being placed on the export of finished products. The export crop sector is relatively well developed and its infrastructure quite sound, a system inherited at the time of independence and perpetuated since then. Current emphasis on food production has led to more attention accorded to the food sector in terms of research and development as well as allocation of other resources. Export crops production is based in part on large estates but with an increasing number of small holders. In contrast, practically all food production is at the subsistence level by family units or collectively through Ujamaa villages on a communal basis. Production technology is mainly labor intensive. As the following FAO statistics show (Table 1), most of the economically active population is in agriculture, and not in industry or the modern sector. It is not implied here that the population is fully employed; there is underemployment during the off-peak season, and even at times of peak labor requirements, a certain proportion of the population is not fully employed.

Agriculture's contribution to GDP has been declining although this sector dominates the economy. The share of the agricultural

sector in the GDP was 45.3% in 1966 whereas in 1977 it was only 38.6% at 1966 prices (Economic Survey 1977/78). The output of food and export crops may have fluctuated due mainly to poor weather conditions but for food it is also influenced by government policy that was not especially directed towards food production.

Table 1. Population in Agriculture (pop. in '000)

	Population		Economically Active Population		
Year	Total	Agriculture	Total	In Agric.	% in Agric.
1965	11,616	10,181	5,121	4,489	87.7
1970	13,273	11,411	5,768	4,959	86.0
1975	15,388	12,872	6,488	5,427	83.7
1976	15,872	13,191	6,637	5,516	83.1
1977	16,371	13,526	6,808	5,625	82.6

Source: FAO Production Yearbook, Vol. 31, 1977.

During the first ten years of independence, i.e. 1961-1971, the GDP grew in real terms at a rate of 4.5% per year; the targets set in the first and second five year plans were 6.7% and 6.5%, respectively. The short fall in GDP growth was related to the contribution of the productive sectors which grew at a slower rate than the others. For example, between 1965 and 1975 the productive sector declined from 58.1% to 51.6% whereas services increased from 41.9% to 48.4%.

The role of industry has been less than that of agriculture. Industrial development has been mainly in the area of import substitution including products such as textiles, alcoholic beverages, cigarettes, etc. Tanzania's policy of the development of import substitution will be expanded along with an emphasis on basic industries, small scale rural industries and food processing industries.

Mineral production also contributes to the economy although production is declining due to exhaustion of reserves and wearing out of the old machinery. However the potential in the long term may be great.

Development Strategy

Tanzania began planning for economic and social development immediately after independence, with the intention of realizing economic and social change with a process of gradual transformation. The rural area was to serve as the base for development. As early as 1961 a World Bank Mission report on the economic development of the country made recommendations which guided the government's policy

for rural production. An "improvement" approach and a "transformation" approach towards agriculture was the guiding policy. The improvement approach did not require a massive infusion of capital but rather required continuing and widespread coordination of services and education and where it was well organized a continuous growth in rural output was achieved. This approach however failed to offer lasting solutions to the main problems of land tenure and agricultural underemployment. The "transformation" approach called for changes of a technical, social and legal nature that would enable adoption of modern techniques to increase productivity. As this would require more planning and organization, the need to create villages as centres of social and commercial development was foreseen. The transformation approach was designed to achieve a reduction of agricultural underemployment in densely populated areas through resettlement schemes. Tanzania started to make comprehensive long-term development plans in 1964 which set the time frame for attainment of general development goals by 1980. It is stated in the First Five Year Plan for Economic and Social Development 1964/1969 that by 1980 (a) per capita income should rise from £19 6s to £45; (b) the country should be self-sufficient in manpower requirements; and (c) the life expectancy should be raised from the then 35-40 years to an expectation of 50 years.

Although planning for economic and social development began right after independence, Tanzania spelt out its path of development and choice of development strategy in 1967 in the Arusha Declaration. The Arusha Declaration evolved mainly from President Nyerere's own thinking on rural socialism (Ujamaa) as an approach to rural development. Ujamaa is based on the belief that the traditional African extended family represents an indigenous form of socialism, the basis of which is equality, freedom, unity, cooperation and non-exploitation. The Arusha Declaration was publicly announced by the President on 5th February 1967 in Dar-es-Salaam following a three day TANU National Executive Meeting in the town of Arusha. This Declaration is the country's blueprint for economic, social and political development. The country committed itself to socialism and self-reliance in a policy based on integrated economic, social and political development. In the economic field the strategy for development is based on the Ujamaa Village program as the main instrument of rural development. The logic of Ujamaa as a determining factor in economic development derives from the fact that the economy depends on agriculture, which is in turn dependent on the people. Since ninety-five percent of the people live in rural areas, development depends on the policy of villagization and rural development as a whole. Whereas earlier policies may have aimed at increasing production without concern as to who was producing what or what the rural peasants were achieving in terms of income or general economic growth, Ujamaa aims at eradicating any type of exploitation and control of the means of production by the people themselves. This policy was also a call for people's efforts to bring development rather than for capital to be seen as a substitute for hard work. The emphasis on rural development was aimed at making the rural areas a better place to live and at reducing

rural-urban differences that were exaggerated by earlier strategies. These had placed too much effort in modernizing the urban centres. Rural development is essential to provide social and economic gains to the vast majority of the people. Tanzania has adopted a frontal development strategy to try and develop all areas of the country simultaneously and this would help reduce differences between rural areas resulting from the greater development in the ecologically and environmentally favoured locations. Implementation of Ujamaa and self-reliance has not been without problems. The country borrows abroad and still receives much foreign aid. There is, therefore, the risk of being forced to make political concessions. Certain donor agencies favour a marked slowdown in rural collectivization. There are criticisms that the achievement of overall development may have suffered from the fact that output goals are not accorded sufficiently high priority relative to social and other goals. Recent discussions show that there is a greater emphasis to increase output through hard work and increased productivity.

At the time of independence, Tanzania declared as its major national enemies--Poverty, Ignorance and Disease. These happen to be very key areas for nutritional improvement as well. Development efforts have been directed to these areas and what we see now is a health system with greater emphasis on rural dispensaries rather than large urban hospitals, more attention paid to spatial distribution of health facilities and more emphasis placed on prevention of disease rather than curative services. The aim is to have most of the population within ten kilometres of a health facility. A comprehensive Maternal and Child Health System has been developed.

In the fight against ignorance the country now has free Universal Primary Education--seven years of school for each child. Now, ninety-seven percent of school age children have been enrolled. Efforts were made to enable every adult to learn to read and write through the Adult Education Program. These efforts have reduced the illiteracy rate from seventy-five percent in 1970 to thirty-nine percent by the end of 1975. Although the country has a low income base, emphasis is being placed on reducing the differences in income. At the time of independence, for salaried workers, the ratio of income between the highest and lowest paid workers was 50:1. Measures were taken to raise minimum wage levels and at the same time restructure the income tax system (in 1974) to make higher income earners to pay higher taxes than before. Also salaries at the top of the scale have not increased at the same rate as those of people lower on the scale. By 1975 the ratio was reduced to 9:1.

Since the majority of the population are rural farmers, increases in their incomes may derive both from factors and services which increase production, and also from better producer prices. At the end of the Second Five Year Plan in 1974 the average per capita income had risen to T.Shs. 660 from T.Shs. 515 in 1964.

NUTRITIONAL PROBLEMS IN TANZANIA AND THEIR ASSOCIATED FACTORS

A. NUTRITIONAL PROBLEMS

1. Protein Energy Malnutrition

Introduction

Protein Energy Malnutrition (PEM) affects millions of children in the developing world and it is the major nutrition problem in Tanzania. Malnutrition may be characterized by both excesses and deficiencies of food intakes. The problem in Tanzania is that of insufficient intakes and long-term deprivations.

In its extreme forms PEM manifests itself as (a) kwashiorkor, (b) marasmus, and (c) marasmic kwashiorkor. The problem of PEM is illustrated using the iceberg analogy. The tip that shows above the surface represents the severe forms and the remainder which is submerged represents all the mild-moderate forms, and the few healthy children. "For every child with kwashiorkor there will be many with equivocal and marginal evidence of malnutrition." But do we know the exact dimensions of the iceberg under the surface? As McLaren points out (1966), too much emphasis had earlier been placed on protein deficiency and its major manifestation kwashiorkor to the neglect of marasmus. By taking 1-3 or 4 year old children as the most vulnerable group, the peak incidence of marasmus which is at an earlier age was missed. Recent years have witnessed changes of emphasis as shown by adjustments in dietary requirements. Overall food deficits are taken to be more important in the problem of PEM than is protein deficiency. There are those who ask, "Hasn't the pendulum swung too far?" Clearly both adequate quantities of energy (calories) and of protein are needed for optimum health and nutritional status.

The categorization of the major forms in which malnutrition occurs is rendered difficult since a child can pass from one form to another. However, it is accepted that kwashiorkor results from consumption of dietary protein of poor quality, and in inadequate quantities. Although calories may be restricted, it is possible to have kwashiorkor even in cases where calories are in excess, although this situation is uncommon. The age group most prone to kwashiorkor are children 1-3 years of age. Nutritional marasmus has its peak incidence in children less than one year old and is a result of restricted intake of food, both calories and protein, on a continued basis. The aetiology of PEM is related to age and rate of growth, the presence of infectious and parasitic disease episodes, child-rearing practices and various deprivations and social, cultural, economic and political factors.

Classification of PEM

For policy purposes, a classification of PEM that may guide the

ordering of intervention priorities and allocation of resources is important. The classification used most in past nutrition surveys in Tanzania is that of Gomez et al. for first, second and third degree malnutrition which uses weight for age as the mean criterion but also takes note of the presence of clinical signs. The Gomez Classification of Malnutrition is as follows:

First degree	75 - 89% of weight for age
Second degree	60 - 74% of weight for age
Third degree	<60% of weight for age

One of the main criticisms of this classification is the failure to distinguish between children who are currently malnourished from those who might at the time of examination be on adequate diet but who have evidence of past chronic malnutrition.

Waterlow (1972) points out that since oedema masks the apparent weight deficit, Bengoa includes as third degree malnutrition all cases with oedema regardless of body weight.

The Wellcome Classification shown below is an easy and practical way for the qualitative classification of severe cases of PEM although, again, it takes no account of retardation and thus the duration of malnutrition. The recording of additional information as is necessary is possible.

Wellcome Classification for Severe Forms of PEM

Weight for Age as % of Standard	Oedema	
	Present	Absent
80 - 60	Kwashiorkor	Undernourished
<60	Marasmic-Kwashiorkor	Nutritional-Marasmus

To take into account the duration of malnutrition, three categories are defined by Latham and Seoane as discussed by Waterlow (1972). Latham, in a paper on a method to distinguish between current acute and past chronic PEM, presents this classification with priority action and prognosis of intervention (Latham, 1973).

1. Acute: Current Acute Short Duration Malnutrition
   Normal height for age, low weight for age, and low weight for height. Because height is normal but weight is low, child has evidence of a recent short duration deficiency of protein or calories.

2. Chronic: Past Chronic Malnutrition
   Low weight for age, low height for age, and normal weight for height. Evidence of presently adequate intake of calories, but has stigma of past long duration malnutrition. Includes recovered children and nutritional dwarfs.

3. Acute on Chronic: Current Long Duration Malnutrition
   Low weight for age, low height for age, and low weight for height. Child has evidence of both a past and present deficiency of calories or protein.

These three categories are equivalent to Waterlow's classification of acute but not retarded (acute), retarded but not malnourished (chronic), and malnourished and retarded (acute on chronic), respectively.

On adequate treatment and good diet, category (1) requires priority action and prognosis is excellent. Category (2) has poor prognosis and it is unlikely that the subject will improve very much. Category (3) has fair prognosis with improvement in weight for age and weight for height possible but a full cure unlikely.

This classification is therefore important for use in designing appropriate nutrition policy and intervention programs, and also in terms of prognosis and possibilities of success of applied nutrition activities. The classification is said to permit health and other nutrition workers to distinguish those children who have the greatest likelihood of benefiting from supplementation or other nutrition programs from those who are unlikely to benefit much. It also provides definite advantages for those wanting a realistic evaluation of programs designed to improve the nutritional status of children.

Magnitude of the PEM Problem in Tanzania

In the absence of a national survey it is difficult to give a genuine estimate of the number affected by the scourges of PEM. Current estimates which indicate the order of magnitude are derived from various sources and these are presented below.

1. In the late 1960's seven regional surveys were conducted. Anthropometric, dietary, clinical and in some cases biochemical indicators were incorporated. Results of some of these surveys are presented in Table 2.

2. A number of independent village surveys have been conducted in relation to specific projects. Several of these have been done as part of the Lushoto Integrated Development Project (LIDEP) by the Max Planck Institute in North Eastern Tanzania, some by the Medical Faculty and TFNC. Estimates of the proportion of the sample with PEM of varying degrees from some of these surveys are presented in Table 3.

Table 2. Estimates of PEM From Regional Surveys

Year of Survey	Region	Severe PEM %	PEM All Forms %
1965	Coast	7	31
1965	Dodoma	4	22
1967	Tabora	1	8
1968	Kilimanjaro	5	26
1967	West Lake	3	12

3. Hospital statistics can also be used to indicate morbidity due to malnutrition. There may be problems with diagnosis but the obvious cases of PEM are difficult to miss and there is great likelihood that many are attended for the terminal ailments that bring them to hospital rather than the underlying malnutrition. Tanzania has three consultant hospitals with relatively good pediatric units. Kimati (1977) has made an interesting analysis from information on PEM compiled for the period 1973-75 from the three hospitals. He arrives at estimates showing that up to 50 percent of all deaths were contributed to by malnutrition or with malnutrition as an underlying cause; also, that malnutrition comprised a large proportion of admissions into pediatric units.

Table 3. Village Nutrition Surveys - Percent of Sample with PEM

Villages in Regions	Severe PEM %	PEM All Forms %
Coast	8.5	62
Tanga	2.7	8.2
Dodoma	5.0	16
Mbeya	2.8	17.7
Morogoro	7.0	37
Mwanza	6.4	58.3
Ruvuma	5.5	44.3

The MCH service keeps records of all children attending clinics classifying them for kwashiorkor, nutritional marasmus, marasmic kwashiorkor and underweight. Since the MCH service has broad coverage, it is possible to compare inter-regional variations and seasonal variations of the most dominant presenting form on the basis of attendances. It is a useful source for mapping out nutritional problems across the country.

On the basis of this information, current estimates are that between twenty percent and thirty percent of all children under five years old suffer from one form of malnutrition or another. In Kimati's analysis referred to earlier, he asserts that of the 2,768,065 children below five years of age, 608,960 have PEM, of whom 110,772 have severe forms of PEM and are sick enough to require hospitalization. Sixty percent of the sick do not attend health institutions. If all cases of malnutrition showed up, it would be impossible to handle them given present health facilities.

Public Health Significance

Malnutrition causes misery, it causes morbidity, occupies hospital beds, increases the cost of health care in countries which can ill-afford it, and it claims lives.

Malnutrition in early childhood is associated with retarded intellectual development. In adults low food intake is known to affect productivity. Most estimates of the contribution of nutrition to economic development are based on effects of increases in caloric consumption on work capacity. Correa (1970) argues that it should therefore be possible to measure the growth in output due to increased productive capacity of labor and estimate the increase in productive capacity of labor due to increased calorie consumption. In energy expenditure studies in Tanzania those communities reputed to be hard-working had mean energy intakes of 2,500 kcal whereas the less hard-working were on mean intakes of less than 2,000 kcals (Maletnlema, 1978a).

Few studies have been done on worker productivity in Tanzania. Davies (1973), in a study of sugarcane cutters, showed that high producers had about twenty percent advantage in VO_2 max. over low producers which was exactly paralleled by the differences in work output in cane fields between the two groups. This, however, accounted for only twenty-five percent of the variance of productivity and other factors are involved. Changes in body composition including loss of body weight at the end of the cane-cutting season are related to the effects of hard physical work on subjects subsisting mainly on a carbohydrate diet.

In adults with deficits of food intake excessive weight loss occurs and during famine conditions, hunger oedema may develop.

PEM often follows an attack of an infectious disease. Malnutrition in children may be preceded by a serious attack of diarrhea, whereas children on marginal diets may show signs of frank kwashiorkor after an attack of measles. Tuberculosis may also be found together with malnutrition. The high death rates from measles in most developing countries are believed to be due to poor nutritional status. Parasitic infections may also contribute to malnutrition. Thus, intervention studies with supplementary feeding may fail to produce any remarkable improvements because children continue to live in

unsanitary environments and experience frequent disease episodes (Scrimshaw, 1975).

2. Iodine Deficiency

People who are on iodine deficient diets develop an enlargement of the thyroid gland which is known as goitre. Iodine deficiency goitre is a defense mechanism designed to keep thyroid hormones at an optimal level and the goitre develops as the number of epithelial cells in the gland as well as the size of the gland increases. The human body is known to contain 40 mg. of iodine of which about half is present in the thyroid gland. Endemic goitre has not been observed in areas where adult iodine intakes are more than 75 mg. per day. Goitre in Tanzania is attributed to a primary deficiency of iodine in the soil, water and food, and the possible goitrogenic effect from the high consumption of brassicas.

Distribution of Goitre in Tanzania

Goitre is known to occur in highland areas far removed from the sea. There are reports, however, of presence of goitre along the coast (in Rufiji). In a report on the prevalence and geographic distribution of endemic goitre in Eastern Africa, Hanegraaf and McGill (1970) show a distribution in the Northwestern part of the country bordering Rwanda and Burundi, the coastal area of Rufiji, the central area around Dodoma, the Southern Highlands area, a highland area on the Eastern shore of Lake Tanganyika called Mwezi, and in Arusha District at the base of Mt. Meru. There may be a high prevalence of goitre in other parts of the country where surveys have not been done.

Goitre Prevalence and Public Health Significance

It is obvious that certain parts of the country are endemic for goitre. Systematic surveys to ascertain the prevalence of goitre were done in the 1960's. The prevalence of 75.9 percent detectable goitres reported by Latham (1965) in a survey of 3002 persons in the Ukinga highlands may be the highest in Africa.

Generally goitres occur more in females beginning at puberty. Growing children and pregnant women may have higher requirements, and lactating women are particularly vulnerable since iodine is lost in milk.

In the Ukinga Survey, Latham found that among children below puberty the prevalence of goitre was only slightly higher among girls than boys. In older subjects, however, the goitre rate was markedly higher in females than in males.

The WHO Classification of Goitre is as follows:

Group 0 - Persons without goitre and persons with the thyroid less than five times enlarged.

Group 1 - Persons with the thyroid more than five times enlarged but not easily visible with the head in normal position.
Group 2 - Persons with goitres which are easily visible, with the head in normal position but which are smaller than group 3.
Group 3 - Persons with large goitres, which can be easily recognized at a considerable distance and which may be disfiguring.

Also included in the classification are smooth or colloid glands and lumpy or adenomatous, nodular glands.

Latham also conducted goitre surveys in Mbeya, and reported on goitres found in his other surveys in Dodoma, Rufiji and Kondoa. Table 4 shows the prevalence data on goitre in Tanzania.

Table 4. Prevalence of Goitre in Tanzania

Area	Sample Size	Total Number With Goitre	Percent With Goitre
Rufiji	173	24	13.9
Dodoma	240	22	9.2
Kondoa	120	13	10.8
(Ukinga) Njombe	3002	2,275	75.9
Mbeya	225	132	58.7
Arusha	1243	34	22.5

A survey of goitre in Mwezi on the Eastern shore of Lake Tanganyika is presented by McGill et al. (1970). This is an area settled by refugees from Rwanda, an area also known for high prevalence of goitre. These investigators reported on goitres in 48 percent of immigrant children and in 67 percent of native children. The sample was 373 school children (285 Rwandan immigrants and 88 local tribes). Goitre was graded by WHO classification. Urine samples from 100 children, and 50 blood samples were analysed. Nearly all children were iodine deficient as demonstrated by a low excretion of iodine in the urine and a low plasma inorganic iodine.

Cretinism occurs in children in endemic goitre areas and is almost certainly due to severe iodine deficiency of the mother. The infant, though appearing normal at birth, is slow to develop, small in size, mentally dull, has a thick skin and a characteristic face with depressed nose and often a protruding enlarged tongue. There appears to be only one case of a cretin reported in Tanzania in the surveys and this was in the high prevalence area of Ukinga in Njombe district (Latham, 1965).

"Perhaps the best example of a disease that can be easily controlled is endemic goitre due to iodine deficiency. This provides an example too of a disease that can be virtually eliminated without social, economic or health changes in the population. But it is a preventable disease which has not been adequately tackled" (Latham, 1973).

Despite the ease of control, goitre continues to affect many people. The enlargement of the gland presents a cosmetic problem and it may produce pressure with symptoms of difficult breathing, persistent cough or voice changes.

Latham had recommended that district by district surveys be conducted to ascertain prevalence. For prevention it was recommended that salt be iodized to produce a level of 1:20,000 parts iodine to salt. Those not getting salt are to be given Lugol's solution. It appears from records that plans were being made to iodize salt but nothing materialized. In the absence of any intervention apart from treating individual cases, there is no reason to believe that the prevalence has changed.

As of 1978, budgetary plans have been made for salt iodization. The major problem is the multitude of salt sources in the country with each manufacturer presenting his own level of impurities.

3. Nutritional Anaemias

Nutritional anaemia may occur due to a deficiency of iron, vitamin B_{12} or protein. Anaemia may also be precipitated by pathological iron losses due to hookworm or other parasitic infections, or to red cell destruction by malaria parasites. In the case of hookworm infection (Nutrition Review Feb. 1968), it is reported that iron deficiency anaemia is likely to develop in adult males with 5,000 eggs/gram faeces and in women and children with 2,000 or more eggs/gram faeces. Since hookworm causes intestinal blood loss, there is accompanying loss of iron. Hookworm anaemia is therefore partly a nutritional problem. It is preferable to characterize the iron status of a population by a frequency distribution of haemoglobin concentration rather than relating it to a single arbitrary reading for Hb concentration. The WHO group of experts recommends the following haemoglobin levels as cut-off points for anaemia for people living at sea level: (1) children 6 months - 6 years, 11g/100ml; (2) children 6 years - 14 years, 12g/100ml; (3) adult males, 13g/100ml; (4) adult females - nonpregnant, 12g/100ml; and (5) adult females - pregnant, 11g/100ml.

Anaemia Prevalence in Tanzania

Several dietary surveys have shown satisfactory intakes of iron, but given the general diets in the country most of the iron is derived from plant sources and very little is heme iron. Only

about ten percent of ingested iron is absorbed and the actual absorption depends on the mixture of foods eaten. Whereas the absorption for red meat is about twenty percent, only five to six percent of the iron in legumes, four percent in maize and wheat, and a low one percent from rice is absorbed. Iron absorption is also affected by the presence of phytates in the diet and the simultaneous consumption of ascorbic acid enhances absorption. Several anaemia studies conducted in Tanzania conclude that iron deficiency anaemia is the main form of anaemia in the country. Hospital records show anaemia as a major cause of morbidity. Nutritional anaemia in hospital records appears in the present classification under the category "Iron deficiency anaemia." As a percent of admissions to government and voluntary agency hospitals there were 2.8% (1972), 1.9% (1973), 4.3% (1974), and 1.5% (1975).

Vaughan et al. (1973), in a study of a 70 percent sample population in a coastal area of the country, conclude that iron deficiency was the single most important cause of anaemia--a combination of a poor dietary intake of iron and an increased loss due to hookworm infection. They regarded as indicative of iron deficiency the low Mean Corpuscular Haemoglobin Concentration (MCHC).[1] They find differences between adults and children. Whereas in adults it is established that iron deficiency is the problem (close correlation between Hb levels and MCHC) and hookworm load; in children there was no clear correlation and anaemia is attributed to possible malaria parasitemia.

Nhonoli et al. (1974) studied three separate populations in districts away from the coast. Some of their results are presented in Table 5. They conclude that in rural children aged 0-14 years anaemia was mainly due to malaria. However, the importance of hookworm and schistosomiasis in the causation of anaemia increases correspondingly from five years of age. In adults after the age of fifteen iron deficiency becomes the dominant form of anaemia. The low Hb levels in rural populations are thus mainly due to multiple parasitic infections and to a certain extent undernutrition.

It is suggested in some of these studies that Hb of less than 13gm/100ml can be considered normal or at any rate acceptable in Tanzania. There are public health policy implications for the choice of cut-off point which is regarded as "normal" for screening purposes, or as "trigger level" for intervention. Vaughan et al. suggest that

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[1] MCHC indicates the concentration of haemoglobin in the average red corpuscle, the ratio of weight of haemoglobin to the volume in which it is contained and the result expressed as a percent:

$$\text{MCHC} = \frac{\text{Haemoglobin gm per 100 ml} \times 100}{\text{Vol. packed red cells, ml per 100 ml}}$$

a haemoglobin level of less than 8gm/100ml may be the critical level at which otherwise healthy villagers should receive treatment. They choose a cut-off point for anaemia of ≤9 gms/100 ml.

Table 5. Mean Haemoglobin in Children of Different Infection Categories, 0-14 Years of Age

Category	0-4 Years	5-9 Years	10-14 Years
Children without infection	12.0 ± 1.3	12.1 ± 1.3	12.5 ± 1.4
Children with hookworm, schistosomiasis, or both	12.0 ± 1.1	11.5 ± 1.4	10.9 ± 1.3
Children with malaria only	10.0 ± 1.8	10.7 ± 1.6	11.5 ± 2.1
Children with malaria plus either hookworm or schistosomiasis	10.6 ± 1.6	10.4 ± 1.2	10.1 ± 2.1
WHO minimal acceptable level for age group	10.8	11.5	12.5

Source: Nhonoli et al., EAMJ Vol. 51, No. 12.

Public Health Significance

Anaemia during pregnancy poses risks of maternal morbidity and mortality plus increasing the risk for the foetus. Anaemia and iron deficiency may also play a role in the ability of the individual to withstand infection.

Anaemia also reduces work capacity due to early onset of fatigue. It reduces the capacity to perform energy demanding tasks by imposing a ceiling on oxygen transport to the tissues.

Some studies of iron deficiency anaemia have shown that the productivity of non-anaemic laborers was about twenty percent higher than that of anaemic counterparts (IBRD, 1974).

4. Vitamin A Deficiency

Vitamin A deficiency mainly manifests itself in conditions of the eye. In the early reversible stages one gets night blindness which, if unattended, would progressively lead into drying of the

conjunctiva and appearance of Bitot's spots, followed by xerosis of the cornea.

Xerophthalmia is the term used for hypovitaminosis A. The advanced stages involving destruction of the cornea are irreversible, often leading to softening and then destruction of the cornea, and complete blindness.

The chief source of vitamin A for most developing countries is the dark green leafy vegetables and yellow vegetables and fruits supplying carotene. But Oomen comments paradoxically:

> It is one of the anomalies of nature that countries with the highest rates of xerophthalmia are among the perenially greenest of the world, but the nutritious green leaves do not find their way into the mouth of the small child (Oomen, 1976).

Vitamin A deficiency may be a complication of a host of diseases including PEM, diarrhea, gastroenteritis, measles, infectious diseases and intestinal parasites such as ascariasis.

The actual magnitude of the vitamin A problem in Tanzania has not been assessed but it is known that pockets of deficiency exist in the country. The problem may not be as severe as that in the countries of South East Asia where, for example, prevalence rate of xerophthalmia is 3.1-4.1 percent in Indonesia, or the Philippines, where seventy percent of children in one province had clinical signs of xerophthalmia (Winikoff, B. (Ed.), 1978). Cases of eye lesions akin to vitamin A deficiency are reported in hospital records.

In a retrospective study of the causes of blindness in children attending schools for the blind in Tanzania, Sauter reports that vitamin A deficiency was the most important cause of blindness in the schools and possibly so for the country as a whole. In a sample of 426 children investigated, blindness in 68.3 percent of the sample was attributed to xerophthalmia. Severe attacks of measles preceded blindness in 36.6 percent of the sample and most of the children showed signs of long standing malnutrition. It is disturbing that even those who are brought to hospitals early may go blind because nobody looks at their eyes, and a massive dose of vitamin A which could prevent blindness is omitted in their treatment (Sauter, 1978).

In a review of nutrition studies in Tanzania, Latham (1967) mentions the work of McKenzie who as early as 1939 described the occurrence of night blindness in Tanzania. Vitamin A deficiency was reported to be a problem in the central region when McLaren in 1961 observed the presence of night blindness, Bitot's spots, xerosis conjunctiva and keratomalacia. Also he is reported to have observed low plasma vitamin A levels around Lake Victoria in Mwanza where the clinical evidence was not obvious in 1959.

A survey conducted by Latham in 1962 in the central region confirmed the findings of McLaren. On investigations of 360 individuals, xerosis conjunctivae, Bitot's spots and night blindness were reported in older children and young adults. In the sample, 3.6 percent had xerophthalmia, 13.6 percent had follicular keratosis type II, and 3.6 percent had Bitot's spots.

Public Health Significance

Apart from complicating the disease picture, vitamin A deficiency may lead to reduction in quality of life through blindness. This has far-reaching social implications for the individual who cannot support himself and for the family that has to care for him. Vitamin A deficiency could induce infections due to the lowered resistance to disease. There is also a high case fatality rate in children with keratomalacia.

5. Fluorosis

Low levels of fluoride in drinking water contributing to dental caries has led to fluoridation of water in some countries. A water supply with one part per million of fluoride will supply one to two milligrams depending on fluid consumption, and that is considered adequate.

On the other hand, excessively high intakes will lead to dental fluorosis with mottled and discolored teeth. In adults who have been on higher fluoride intakes over a long period of time, bone changes occur with increased bone density, calcification of muscle insertions and exostoses (bony enlargements or lumpy swellings on the surface of a bone). In areas of Northern Tanzania where levels of fluoride in water go as high as 45.5 ppm., dental fluorosis is a common problem. A survey was conducted on the foothills of Mt. Meru (Latham, 1967) to ascertain the effects of prolonged intakes of high levels of fluoride in 1,243 people. The study sites used water with fluorine levels above 5.5 ppm. Extensive brown mottling of the teeth was observed and in some cases typical chalky white patches were seen. Ninety-five percent of all those examined were affected. In a group of older subjects who had lived in the area for more than ten years radiological examinations were performed. Of this subsample, 87 percent (of 112 people) showed bone changes believed to be due to fluoride intake and in 19 percent of them, these changes were very marked. These radiological findings included increased bone density of the vertebrae, ulna and radius, and abnormal calcification of muscle insertions and other soft tissues.

Fluorosis may be a problem that does not command much attention. But for the individuals who are affected, fluorotic teeth present a cosmetic problem. Those with skeletal fluorosis, particularly the elderly, may have medical complaints of bone-ache, and bone deformities which may become crippling.

In general, in Tanzania it seems that dental caries is much less prevalent than is the case in the industrialized nations. This is presumably due largely to current diets and the relatively low consumption of sugar, soft drinks, and other cariogenic foods.

6. Other Deficiencies

Cases have been reported involving deficiencies of B vitamins and these have not amounted to levels of public health significance. Conditions of vitamin B deficiencies as manifest in loss of motor coordination, are mentioned in people on institutional diets, mainly refined cereals over prolonged periods of time, but no cases of beriberi have been described. Occasional outbreaks of pellagra have been reported, and pellagra is seen sporadically in several areas of the country. Riboflavin deficiency has been described and in a survey of the Rufiji district following famine, 12 percent of the sample had angular stomatitis and 18 percent cheilosis of the lips. In the central region 14.4 percent had angular stomatitis and 31.1 percent cheilosis of the lips (Latham, 1967).

Vitamin B_6 deficiency has been precipitated in patients on isonicotinic acid hydrazide treatment for tuberculosis in Tanzania (Latham, 1967).

Classical scurvy due to vitamin C deficiency is seldom seen in Tanzania and although dietary intakes of vitamin D are very low, there are no serious cases of rickets and osteomalacia due to the abundant sunshine.

B. FACTORS CONTRIBUTING TO POOR NUTRITIONAL STATUS

It would be possible to discuss factors contributing to poor nutritional status for specific diseases. Most of these factors would apply to several deficiency diseases and so it is preferable to present these in a separate section. Common to practically all cases of nutritional deficiency are poverty, poor environmental sanitation, low incomes and wages, absolute lack of food or its maldistribution either in society or households, the multitude of disease conditions, and lack of education at all levels. Malnutrition is both a cause and an effect of underdevelopment. Some of these factors as they apply to the Tanzania situation are presented below.

1. Low Food Production

Low food production, meaning a lack of available food, may lead to malnutrition. Given the importance of this and its implications on agricultural policy, a whole section is devoted to a discussion of the food supply situation and this will not be discussed any further in this section.

2. Low Food Intake

The quantity and quality of food consumed is a strong determinant of nutritional status of individuals. The basic diet of Tanzanians has a cereal base with variations across tribal groups. Maize is the dominant cereal consumed together with rice, sorghum and millet. In the Northern areas of the country--Kilimanjaro and Arusha--in West Lake Region and areas of the Southern highlands, bananas or plantain assume a very important role in the diet. Consumption of cassava is high along the coast and in certain other areas of the country. Consumption of legumes, vegetables and fruits of all kinds is high, while intakes of meat, fish and dairy products are generally low.

There is general agreement that overall food consumption is low and that the main cases of malnutrition are those of marasmus and marasmic kwashiorkor. Florid cases of kwashiorkor occur but are observed less often. Although the diet is mixed and varied, the diets are often quite bulky for the young child. Cassava and plantain or banana based diets for children might be expected to produce more kwashiorkor. The information we have is not conclusive but there is no proof of any more kwashiorkor than the other forms of malnutrition where these foods are the staples.

The various food consumption surveys conducted in Tanzania provide the following estimates of food intake.

Table 6. Estimates of Food Intake/Day from Consumption Surveys

Energy	-	1,400-2,500 Kcal.
Protein	-	24-35 gms. (calculated for reference protein)
Iron	-	16 mg. (considered adequate but very little heme iron)
Calcium	-	310 mg. (very low)
Vitamin A	-	220 gms. of retinol (very low)
Vitamin C	-	55 mg. (adequate)
Thiamine	-	1.0 mg. (low)
Fluorine	-	Low/high
Iodine	-	Low

In studies of pregnant and lactating women, Maletnlema et al. show that 10-25 percent of those investigated had energy intakes comparable to only 50-75 percent of their requirement (Maletnlema and Bavu, 1974). From the various food consumption surveys, the reported ranges of mean food intake were 1,400 $\pm$ 360 Kcal. to 2,500 $\pm$ 192 Kcal. per day. There are those who are living at levels of intake barely adequate to engage in productive activity (Maletnlema, 1978a).

3. Diseases

The relationship between nutrition and infection has been well documented (Latham, 1975).

Poor nutrition predisposes to infection and in areas of limited food consumption, malnutrition often follows after an episode of infection. The two terms that enter into description of the relationship of nutrition and infection are synergism and antagonism. Synergism is used to describe the situation where infection interferes with normal nutrition or malnutrition lowers host resistance to infection. When malnutrition and infection occur together, their consequences on the host are worse than the additive effect of the two working independently. With antagonism the combined impact is less than would be expected from the sum of individual effects, e.g. when nutritional deficiency limits the ability of an infectious agent to cause disease. Antagonism is not apparently common in humans.

The prevalence of infectious disease is very high in Tanzania. Gastroenteritis, mainly diarrhoea, is very common; also prevalent are respiratory infections, malaria, measles, parasitic infections, like hookworm. Table 7 presents morbidity and mortality statistics from the Muhimbili Hospital in Dar es Salaam. Case fatality rates for malnutrition are second only to tetanus with measles following close behind. In developed countries with children of good nutritional status, measles is a very mild disease. In many cases, children suffer from multiple ailments making both diagnosis and treatment difficult. Effective public health measures, like improvement of environmental sanitation, better sources of drinking water, malaria control, immunization, will all go a long way in the fight against malnutrition.

Table 7. Main Causes of Morbidity and Mortality for Pediatric Wards at Muhimbili Consultant Hospital 1975-1976

Disease	Total Admissions	Deaths	Case Fatality	Percentage of all Deaths
Gastroenteritis	2,430	75	3.1	5.8
Measles	2,363	265	11.2	20.4
Respiratory disease excluding T.B.	2,203	135	6.1	10.4
Low birth weight	2,053	247	12.0	19.0
Malaria	744	9	1.2	0.7
Anaemia incl. sickle cell anaemia	467	35	7.5	2.7
Accidents	346	0	0	0
Severe PEM	256	35	13.6	2.7
Tetanus	112	51	45.5	3.9
Pulmonary T.B.	60	4	6.7	0.3
Others	2,670	440	-	-
Total cases	13,708	1,296	-	-

Source: Kimati, V. P. Lishe No. 2.1, 1977.

4. Poverty

The major immediate cause of hunger is the lack of resources with which to buy or produce enough food. This may be due to extremely low national output and income combined with maldistribution of the income that is available. The national average per capita income is less than 1400 shillings or $200 per annum in Tanzania. These low levels of income mean a lack of purchasing power, and are a contributing factor to low dietary intakes. As has been described, those with low levels of income are almost invariably the ones with little formal education, poor facilities and also low food availability. Poverty in the country co-exists with malnutrition in 90 percent of the cases (Maletnlema, 1978a). It has been noted that 70 percent of all Tanzanians have less to spend on food than could satisfy their requirements.

Income may be the single economic variable most affecting qualitative changes in diet over time. The income elasticity of demand for food decreases as income increases. There are estimates for Tanzania that the income elasticity of demand for cereals is 0.32 (0.31 assuming high income growth), for pulses/nuts it is 0.6, and for meat the elasticity is 1.0 (IFPRI, 1977a). These figures indicate therefore that even needs for basic staples like cereals are not yet being fulfilled. Some of the information we have relating income and food consumption are estimates from the Household Budget Survey. We use these estimates with caution since this survey was not well designed to collect information on food consumption. The estimates show that even at low income levels expenditures on cereals are increasing. The meat group shows dramatic increase whereas starchy roots seem not to increase.

It is very tempting to use least cost diets for estimating the minimum income necessary for fulfilling basic dietary requirements. Computer programs are available to do this. Such an exercise done for Sao Paulo in Brazil by Alves, Evenson and Rosenzweig in 1978, showed that only 3 percent of the households were spending less on food than the minimum cost diet. However, 25.6 percent could not meet their caloric requirements, meaning that those foods purchased do not necessarily fulfill nutritional requirements but that tastes and preferences are important. Pyatt and Thorbecke (1978), on discussing Poverty and Basic Needs, add that "Identification of a minimum cost bundle of commodities satisfying a specific basic need which is also consistent with tastes and preferences of the consuming household group is essentially an arbitrary and judgemental process."

It should therefore not come as a surprise that observations like those of Sao Paulo are seen.

5. Ignorance

"Who is ignorant?" That was the theme of a paper presented at the Conference of Physicians for East and Central Africa, marking the Silver Jubilee of that association (Maletnlema, 1978b). And so if ignorance produces malnutrition, who in actual fact is ignorant? Often the lack of proper education on dietary practices, taboos and food restriction and a whole set of social cultural aspects have been blamed for precipitating poor nutritional status. How about those in responsible positions who have the policy means at their disposal to improve nutrition, and yet have failed to bring about nutritional improvement--aren't these ignorant? How about the many nutritionists who have tried to institute changes in dietary practices without learning why such practices prevail and what meaning and attachment they offer to society as a whole--aren't these ignorant? If nutrition should benefit from elimination of ignorance then everybody is affected and needs some amount of education. I strongly believe that the problems of poverty, and lack of purchasing power, low food availability, and a host of other factors, as pointed out in different sections of this paper, plus other social and economic injustices, are more responsible for producing malnutrition than the sheer ignorance of those affected.

TRENDS IN THE FOOD SUPPLY SITUATION IN TANZANIA

Introduction

When Malthus made his postulation that population growth is outrunning food supply, some considered that he lacked foresight of the possibility of technological development in agriculture to increase food production and the possibilities of declining levels of population increase accompanying economic development leading to demographic transition as already witnessed in most developing countries (Winikoff, 1978).

Yet it remains a fact that today, despite tremendous increases in food production, millions go hungry. Many estimates point to the fact that on an aggregate world basis production is sufficient to fulfill minimum food requirements if distributional problems could be taken care of. Most of this food is in the world's grain baskets, the developed regions like United States, Canada, etc., where programs are developed for surplus disposal. Most developing countries face chronic hunger and famine, and sometimes are blamed for aggravating the world's food problem. Some of the factors suggested that contribute to low food production in developing countries include the adoption of inappropriate development strategies putting too much emphasis on industrialization first, and a degree of relaxation in agricultural policies knowing that aid may be forthcoming.

If efforts to increase food consumption as a measure of solving nutritional problems are to be successful, then it is important to

ensure available food supplies. In looking at the food supply situation in Tanzania, I will limit my analysis mainly to the 1970's. Cereals will be used as a proxy for total food, for reasons that their statistics are better compiled and they also constitute the bulk of the diet. Components of available supply, that is, domestic production, commercial imports and food aid, will be examined. The aggregate supply in the form of food balance sheets will also be presented and the levels of self-sufficiency discussed. Statistics are also included on projections of supply and demand.

(i) Domestic Food Production

It has been reported that Tanzania started to experience a deterioration in the supply/demand balance for food grains during the late 1960's and early 1970's, culminating in the severe food crisis of 1974 and 1975. Apart from the environmental factors, an investment bias favoring the cash or export crops sub-sector of agriculture has been clearly shown to be a major factor leading to this deterioration (United Republic of Tanzania, 1979). The worst years were at a time when there was a world decline in production and an impending food crisis with some of the worst hit areas being in Africa, including the Sahel.

Despite this deterioration, analysis of self-sufficiency levels based on production data for the period 1970-1972 places Tanzania slightly above the line of 100 percent self-sufficiency in food (O'Hagan, 1976).

The country is now recovering from the poor production levels in those years and trends are towards increasing production of major cereals. Table 8 below gives trends in domestic production of cereals for a five year period based on data from the Ministry of Agriculture.

Table 8. Cereal Production in Tanzania ('000 tons)

	1972/73	1973/74	1974/75	1975/76	1976/77
Maize	847	761	1367	1499	1673
Paddy	189	223	265	346	314
Wheat	89	85	82	69	64
Sorghum	195	200	318	438	519
Millet	100	114	137	131	236

Source: TFNC Data Report, 1978.

Despite problems of inconsistency in statistics, the trends are in general agreement with observations. The achievement in the current increases in grain production is a result of major government activities.

Following the poor harvests, the government started a major campaign for increasing food production, "Agriculture as a Matter of Life or Death," and all institutions including parastatal organizations were called upon to be production units. The investment by parastatals may not necessarily have matched production levels. Maize has been accorded a very high priority for increased production, because it is the chief cereal. The National Maize Project was started in 1975 in cooperation with the International Development Association to boost small holder maize production. This project was designed to increase yields in a total of 950 villages to cover thirteen regions in the country that are important for maize production. A technological package is applied to achieve increases of yield including new seeds (hybrids), chemical fertilizers and extension services. The targets for increases of production are intended to achieve a growth rate of 5.7 percent compared to the old 2.7 percent. Similar efforts are being made to increase paddy rice production on large scale estates using several inputs. Sorghum and millet are important cereals in drought areas and under weather-failing conditions in other favorable areas. Expansion in the production of these cereals is incorporated in the National Agricultural Development Program.

Even though a production increase has been registered in absolute amounts, on a per capita production basis this has been at a lower rate than for total food and overall agricultural production. The production of cereals alone has increased faster than population. Tables 9 and 10 are illustrative of the growth in total production and per capita production which may partly explain the maintenance of food imports despite increases in production.

Table 9. Rate of Growth of Population and Food: Agriculture and Cereal Production in Tanzania

Pop. Period	Growth Rate in Pop.	Production			Per Capita Prod.		
		Food	Agr.	Cereals	Food	Agr.	Cereals
1961-1965/70	2.8	3.5	3.1	3.5	0.6	0.2	0.6
1970/76	3.1	5.9	4.5	14.4	2.8	1.4	11.6

Source: FAO Statistical Yearbook Vol. 30, 1976.

Table 10. Index of Total Food and Per Capita Food Production Base 1969-71 = 100

	1973	1974	1975	1976	1977
Total food production	104	102	107	111	116
Per capita food production	96	91	93	93	94

Source: FAO Statistical Yearbook Vol. 31, 1977.

(ii) Commercial Food Imports

Commercial food imports are those for which the government makes cash payments in procurements. The food crisis of the early 1970's necessitated massive imports of grains. It is estimated that for 1975/76 alone a total of T.Shs. 600 million was spent on import of grains. In 1976/77, a satisfactory year in terms of production levels, the country spent T.Shs. 177.6 million for import of cereals to make up for the gap between domestic production and national requirements. Yet in 1977/78 a further T.Shs. 230 million was spent on grain imports. The most up-to-date available statistics indicate that for the period July 1977 to March 1978, 34,200 tons of maize, 14,650 tons of paddy, and 34,500 tons of wheat were imported (United Republic of Tanzania, 1979; Economic Survey 1977-78).

The problem of financing an adequate food import bill undoubtedly becomes a major barrier to adequate consumption in cases of reduced production. Differences in reporting periods between production and imports often render direct comparisons difficult. Table 11 however illustrates levels of imports for main cereals.

Table 11. Net Cereal Imports Including Food Aid 1973-1977
('000 tons)

	1973	1974	1975	1976	1977*
Maize	13.2	254.7	231.4	72.0	34
Rice	0.7	71.2	64.0	8.8	40
Wheat	12.3	102.7	157.5	30.0	30
Sorghum/Millet	2.6	0	4.8	0	0

* From URT 1979 - Agriculture in Tanzania, pp. 16.
Source: TFNC 1978 Data Report.

(iii) Food Aid

Tanzania receives food aid from a number of donor countries and organizations. The U.S. has assumed the position of a major donor in Tanzania over a relatively short period of time. The U.S. food aid program was developed in the mid 1950's as a means of distributing surplus production with minimum interference with existing markets as well as a way of developing new export markets with sales under title I and donations under title II of Public Law 480. Although this food was also used to finance certain development projects and provided disaster relief, improvement of nutritional levels was not the major objective. That donations depend entirely on production levels in the donor country, is exemplified by the fact that with diminished supplies, the U.S. food aid program in 1974 delivered

a volume that may be lowest since the program started (USDA Economic Research Service, 1974).

Critical observations of food aid in Tanzania mapped out the sources and flow of food aid in the country (Jonsson, 1977; TFNC, 1978). Food aid received from U.S. PL480 is channeled through the National Milling Corporation both for famine relief and commercial sales. This consists mainly of cereals. Through the Ministry of Health are channeled products like milk, corn-soy blend, and oil, which are distributed for malnourished children through MCH clinics. The Catholic Relief Service distributes food to clinics, day care centres and for the school feeding program. Bilateral donations from countries like Australia, U.S. and Canada are channeled through the National Milling Corporation and used as outlined above. Tanzania receives food aid also from the European Economic Community. EEC food aid is from growth of donations as a result of large surpluses of grains and dairy products created by high producer prices for commodities under the community's common Agricultural Policy. Their aid is composed of two-thirds dairy products and one-third cereals. Most of the dairy products from the European Community are pledged for distribution through the World Food Program. The latter is a United Nations' program established in 1962, attaining permanent status in 1965. Donations of milk from EEC channeled through the Livestock Authority are reconstituted and distributed through commercial channels. Through UNICEF some food is distributed to Day Care Centres. Some of the food received from the World Food Program, apart from being used in Day Care Centres, is distributed to refugees to help in their resettlement. The report on food aid (TFNC, 1978) revealed that for the year 1975/76 there were about 233,000 beneficiaries of the food aid program. Table 12 shows the kinds and quantities of products received over a three year period. Problems related to food aid will be discussed under the section dealing with policy options for increasing food supply.

Table 12. Food Aid in Tanzania 1974/75-1976/77 ('000 tons)

	1974/75	1975/76	1976/77
Maize	10.0	40.2	41.4
Rice	0	20.0	20.0
Wheat	37.8	29.0	33.0
Wheat meal	8.7	0	0
Sorghum	0	13.5	0
Bulgur wheat	0	1.2	0.7
Corn-soy blend	0	6.1	3.5
Dry skim milk	0.1	2.2	4.5
Vegetable oil	0.4	1.7	1.3
Butter oil	0	0.5	1.7
Beans	0	0	0.2
Rolled oats	0	0	3.0
Total Cereals	56.5	102.7	114.4

Source: Tanzania Food and Nutrition Journal No. 2.2, 1978.

(iv) Food Balance Sheets

As a measure of aggregate food supply, food balance sheets have been calculated for Tanzania. Food balance sheets were originally developed as an indirect measure of a country's nutritional status through knowledge of food availability in those countries. They have gained application in other studies like cross-sectional studies of income and food consumption (e.g. Perisse, Sizaret and Francois, 1969).

Major criticisms are levied on food balance sheets as a gross accumulation of errors which end up with a major distortion, when these figures are translated into per capita food availability. New methods are being developed like the Food Accounting Matrix which can show interdependence between production, income expenditure and consumption (Hay, 1978). Tanzania has calculated food balance sheets for a number of years on the basis of available data. We recognize the inherent problems in using these as a tool of assessing the country's food supply but they will remain for some time the main source of estimates on trends in per capita food availability. A summary of the food balance sheets is presented in Tables 13 to 15.

Table 13. Supply of Energy From Major Food Items in Food Balance Sheets

	K Calories Per Capita Per Day			
	1972/73	1974/75	1975/76	1976/77
Cereals	851	1109	1383	1350
Starchy foods	583	932	1168	1098
Sugar	111	83	78	86
Pulses	167	288	228	256
Vegetables	27	27	27	27
Fruits	28	28	28	28
Meat	67	49	49	59
Eggs	4	4	4	4
Milk	94	78	32	32
Fish	24	30	28	27
Oils and Fats	50	56	65	64
Grand Total	2009	2683	3084	3030

Source: TFNC Data Report, 1978.

The supply of calories, proteins and fats from different food items and the proportion of calories supplied by these have been examined (Mgaza, 1978a and b).

Table 14. Supply of Protein From Major Items in Food Balance Sheets

	Gram Protein/Capita/Day			
	1972/73	1974/75	1975/76	1976/77
Cereals	22.0	28.9	34.4	35.5
Starchy food	5.5	3.9	4.5	8.7
Sugar	0	0	0	0
Pulses	8.1	15.1	12.6	14.5
Vegetables	1.7	1.7	1.7	1.7
Fruits	0.3	0.3	0.3	0.3
Meat	4.9	5.1	5.2	6.1
Eggs	0.3	0.3	0.3	0.3
Milk	4.9	3.8	1.9	1.8
Fish	4.1	3.9	3.6	3.5
Oils and Fats	0	0	0	0
Grand Total	52.0	63.0	64.5	72.4

Table 15. Supply of Fats From Major Items in Food Balance Sheets

	Gram Fat/Capita/Day			
	1972/73	1974/75	1975/76	1976/77
Cereals	8.0	11.5	14.9	13.0
Starchy food	1.4	0.3	0.3	0.5
Sugar	0	0	0	0
Pulses	7.0	8.3	6.7	4.5
Vegetables	0.2	0.2	0.2	0.2
Fruits	0.3	0.3	0.3	0.3
Meat	5.2	4.1	4.2	5.0
Eggs	0.3	0.3	0.3	0.3
Milk	4.7	3.5	1.4	1.4
Fish	0.4	1.0	0.9	0.9
Oils and Fats	5.7	6.2	7.2	7.1
Grand Total	33.2	35.7	36.4	33.2

Source: TFNC Data Report, 1978.

As expected, cereals have remained the main supplier of energy followed by starchy roots and tubers. Proteins are supplied mainly by cereals and pulses. Animal products are less important in the

supply of both energy and protein. For the years in question supply of energy from carbohydrates ranged from 75%-81%, from protein 8.4%-10.3%, and from fats 9.9%-14.9%.[1] The supply of energy from oils and fats is actually on the decline and this follows on the decline of production of oil seeds confirmed by actual observation of consumption of oils and fats whether separated or unseparated which are generally low in Tanzanian diets.

The increases in per capita food availability as shown in food balance sheets is not a cause for relaxation and there is no pretense that the majority of the population are near these levels of consumption. We need to complement these data with studies or investigations to ascertain the levels of consumption and distributional aspects. The study of Reutlinger and Selowsky (1976) is a very good illustration showing clearly that even in countries where per capita availability exceeds requirements a breakdown of consumption by income groups reveals that quite a sizeable proportion of the population within countries may be well below requirement levels.

(v) Projections of Supply and Demand

The International Food Policy Research Institute has undertaken a comprehensive study of the food situation in developing countries (IFPRI, 1977a). On the basis of production trends, population growth and income elasticities, projections were made on food supply and consumption. Data presented in that report on Tanzania are extracted as shown in Table 16.

The situation for Tanzania is summarised in the following words:

> Staple crop production grew 3.1% per year in 1960-75 but with one of the highest population growth rates in Africa, 3.2% per year, a serious food situation is projected in Tanzania in 1990. The projected food deficit would rise from one quarter million metric tons in 1975 to 1.0-1.1 million metric tons. A deficit of 2 million metric tons would be incurred to meet the food energy target. Food production would need to rise to around 4.4% to meet marked demands from internal production and to over 5.5% per year to meet the nutritional target.

Is there reason for so much pessimism considering the country's current efforts? There are possibilities that the report used the lowest estimates of food production available. Adding up the Ministry of Agriculture's production estimates which are the highest among available estimates for the major foods (maize, rice, wheat, millet,

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[1] Compare with recommendations of proportions of supply of energy of: 60-70% from carbohydrates; 20-30% from proteins; 10-15% from fats. Source: FAO/WHO Expert Committee - Energy and Protein Requirements, 1973.

sorghum, cassava, sweet potatoes, bananas) for 1974/75, I get a production estimate of 4,938 thousand metric tons.

Table 16. Projections of Food Supply and Consumption and Deficits in Production

	'000 metric tons
Food Production 1975	3,271
Food Production 1990	4,980
Food Consumption 1975	3,549
Food Consumption 1990	
(a) at 1975 per capita level	5,951
(b) with low income growth	6,951
(c) with high income growth	6,085
(d) at 110% of energy requirements	7,251
Deficits in Production of Major Staples	
1975	278
1990	
(a) at 1975 per capita level	472
(b) with low income growth	971
(c) with high income growth	1,105
(d) at 110% of energy requirements	2,271

Secondly, estimated income elasticities of demand for food that are used for cereals equal to 0.31 (0.32 assuming low income growth), for pulses 0.60 and for meat 1.0. The high elasticity for cereals is suggestive that most people are unable to fulfill their food needs even for basic staples.

The projected food demands (Table 17) for 1981 within the Third Five Year Development Plan are close to IFPRI estimates for 1990 at 1975 per capita consumption levels. Given current production trends and if Tanzania can achieve its production targets, the situation may not be as bad as projected in the IFPRI study.

Table 17. Projected Food Demand by 1981 ('000 tons)

Crop	Av. Prod. 1970-1972	Demand Target 1981	Increase Above Av.1970-71 Percentage	Av. Prod. 1972/73-1976/77
Maize	866	1360[a]	57	864
Paddy	194	315[a]	62	252
Sorghum/millet	347	750[a]	116	344
Wheat	43	127	165	54
Sugar	90	275	305	99
Beans & other pulses	188	251	33	200
Seed oil	21.1	49	130	-
Bananas	976-1060	1350-1450	35-37	1138
Cassava (dried)	645	850	32	750
Potatoes	375	524	40	432
Vegetables	133	209	57	-

[a] Excludes exports and strategic grain reserves which would require another 75,000 tons maize, 15,000 tons paddy, and 20,000 tons wheat and 10,000 tons other grains.

Source: United Republic of Tanzania, Third Five Year Plan for Economic and Social Development.

(vi) Index of Self-Sufficiency

Tanzania is committed to a policy of self-sufficiency in food. The actual levels of self-sufficiency attained vary from year to year depending on production levels. Self-sufficiency ratios have been calculated to the period 1975 using cereals as an adequate proxy for total food (IFPRI, 1977b). The Adjusted Self-Sufficiency Ratio (ASSR) which measures the capacity of the country to increase cereals production fast enough to keep pace with population growth for Tanzania has a mean between 94 and 106 (ASSR $94 < \bar{x} \leq 106$). Given production trends to 1975 both the ASSR[1] and the SSR[2] were declining, with the SSR declining at a slower rate. Up to the period 1977/78 Tanzania has not achieved self-sufficiency in any of the major cereals although levels of imports are declining as production levels increase.

[1] ASSR - per capita production of cereals for each year in period 1960-75 divided by average per capita consumption of cereals in base year period 1960-62.

[2] SSR - per capita production of cereals for each year in period 1960-75 divided by per capita consumption of cereals each year in the period 1960-75.

FOOD AND NUTRITION POLICY: NEEDS AND POTENTIALS

Most of the malnourished are the poor and underprivileged. They lack most of the resources and means for their own improvement, the provision of which is in the hands of those in power. For governments committed to the eradication of malnutrition, the formulation and implementation of deliberate policies for such course is necessary.

1. What is a Food and Nutrition Policy?

Concern for the solution of nutrition problems has centered around the need for improvement of both the quality and quantity of the food consumed by the population at risk of malnutrition; and the provision of such services as will ensure efficient utilization. Policy means at the disposal of the government can be used to achieve this where priority is accorded to nutritional improvement. Several definitions of a food and nutrition policy have been offered. At his address to the First Session of the Committee on Agriculture in 1972, the Director of FAO's Nutrition Division gave the following definition:

> A food and nutrition policy is a complex set of educational, economic, and legislative measures designed to reconcile at a level judged feasible by the planner-food demand, forecast food supply, and nutritional requirements (FAO, 1972).

Contained in this definition are the means through which the nutritional targets can be achieved. The aspect of feasibility is included to point to the need for individual countries' policies to lay down priorities according to what is possible given available resources.

Various efforts toward the reconciliation of food demand, supply and nutritional requirements would lead to measures which constitute a food and nutrition policy. The Interagency Consultative Meeting on National Food and Nutrition Policies for the Americas defined a food and nutrition policy as:

> A coherent set of principles, objectives, priorities and decisions; adopted by the State and applied by its institutions as an integral part of national development plan in order to provide all the population within a specified time with food and other social, cultural and economic conditions essential to satisfactory nutritional well being (Bengoa and Rueda-Williamson, 1976).

Given this definition, Beaton (1975) argues that in its broadness this concept approaches a national development plan itself rather than being its integral part. As such, it has inherent problems of feasibility of implementation.

There is agreement that a food and nutrition policy has to be formulated as an integral part of national development plans for economic and social development. Nutrition has to be included as a criterion when formulating policies in sectors known to influence nutrition, particularly to the extent that nutritional considerations have hitherto been neglected.

If the development of a food and nutrition policy has to stimulate and coordinate policies in the various sectors, the following areas have been regarded as relevant:

i) policies related to food supply: production, trade, industry, storage and marketing.

ii) policies related to food demand: incomes, food prices, supplementary feeding, consumer education, population.

iii) policies related to biological utilization: disease, physiological state, physical activity, food intolerance.

iv) other related policies.

Whereas a food policy deals essentially with food production strategies designed to minimise adverse balance of payments effects and offer national food supplies security (Payne, 1976), a food and nutrition policy takes account of food problems having important health implication of a nutritional nature and also those nutritional problems not related to food.

2. Potentials of a Food and Nutrition Policy

The main function of a food and nutrition policy is to ensure that nutritional implications of policies developed by various sectors are given appropriate consideration. Interactions between various sector policies have to be examined and coordinated for the improvement of health and nutrition of the people. In operational terms a food and nutrition policy would be a tool offering areas of consideration rather than a precise listing of specified activities. It has the potential of developing a workable coordinated plan of activities within different sectors that will result in nutritional improvement and provides a framework within which specific programmes can be developed. General improvement of nutrition will depend on the social, economic and political criteria applied in the allocation of resources. A food and nutrition policy in, and of, itself will not guarantee improvements unless there is deliberate implementation of programmes in the policy's context. Like any other effort to solve nutrition problems a vast amount of information will be required. Basic to the planning of policies towards eradication of malnutrition is understanding of the processes behind its causation. The political nature of the mal-

nutrition problem is a subject of controversial discussions.[1] Nutritional problems do not occur in a political vacuum, and to a large extent they reflect the structure of society where the malnourished are located (Hakim and Solimano, 1976). The allocation of resources for their improvement is itself a political process. The planners of actions to solve such problems must therefore be in agreement on what the causes of malnutrition are. As often is the case, analysis stops at quantifying the malnourished and most current survey methods are handicapped because they fail to ask the question why? Only when we have answers to this question can efforts be directed at the root causes of the problem.

If malnutrition is seen as a transient problem that can be solved by the process of development, there are those why may argue that what developing countries need is development and nutritional problems will be solved. But don't the world's developed nations also harbor the malnourished? Estimates from the U.S. Census Bureau indicate that nearly 24 million Americans lived below the "poverty line" in 1978, and that this entailed serious consequences for their nutritional status (Group on GPID, 1979).

It is noteworthy that many of those countries that have registered improvements did not have nutrition policies. But they have had strong policies involving social change that had nutritional implications, they have had very definite food policies including food distribution programmes, and they have given much attention to equity, e.g. China and Cuba. Alternatively there are those nations which have achieved rapid rates of economic growth with participation of the masses which allowed equitable growth to impact on nutrition, e.g. South Korea.

A food and nutrition policy, adaptable to changing problems, can:

a) on the basis of existing evidence point out the possible nutritional implications of alternative policy measures in the whole area affecting food and nutrition,
b) weigh alternative or complementary approaches to be defined,
c) guide priority decisions in the area of food and nutrition,
d) provide a mandate for nutrition activities, and
e) lead to the inclusion of indicators of nutritional status as important criteria for the evaluation of the social impact of economic development plans.

A food and nutrition policy will be concerned with the three macrovariables affecting nutritional status, i.e. food demand, food supply and biological utilization. Figure I, adapted from Perisse, shows

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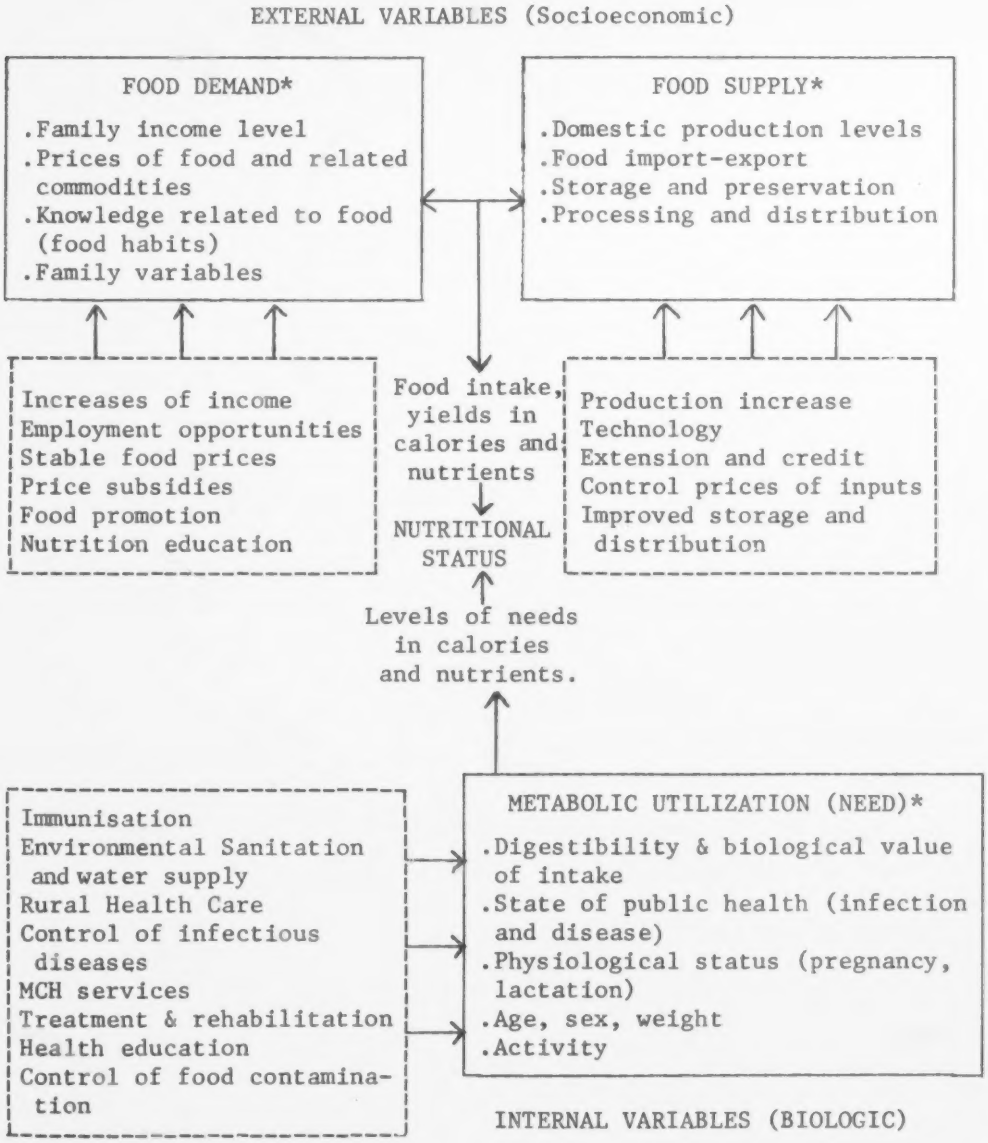
[1] This raised debate on what is/is not "scientific" in discussion of the 2nd plenary session of the 3rd European nutrition conference. See for example U. Jonsson & T. Brun "The politics of food and nutrition planning - a preliminary paper on its socioeconomic context," in Nutrition Planning, The State of the Art, L. Joy, ed.; also J. O. Field and F. James Levinson "Nutrition and Development - Dynamics of Political Commitment," Food Policy, Vol. 1, No. 1, 1975.

Figure I. Macrovariables Affecting Nutritional Status and Related Policy Measures



* = Macrovariables

[ ] = Policy measure

Modified from J. Perisse "Food and Nutrition Planning." In: Mayer, J. & Dwyer, J. (ed.), Food & Nutrition Policy in a Changing World. Oxford University Press, 1979.

these macrovariables and the appropriate policy measures. Food supply will be affected by agricultural policy involving both production and post-harvest handling of food. The allocation of resources towards food production, the balance of food and export crop production, credit and terms of trade are all important. Development plans have to ensure that food production meets nutritional needs of the population, particularly the low income groups who are vulnerable to nutrition problems. Those parameters related to food demand are affected by economic policy. The creation of productive employment, reasonable food prices to consumers, and consumer subsidies can be considered. Also through nutrition education it may be possible to influence nutritionally sound food practices. Improvement of environmental sanitation, preventive health services, a rural based health care system, will help to reduce the stress and needs for extra nutrients.

In nutrition planning, the nutritional impact of major government programmes can be examined. For example, if a dam will be built across the Rufiji River and the water to be used for irrigation, what are the possibilities of creating breeding grounds for mosquitoes and the spread of schistosomiasis? Will these outweigh the benefits to be derived from irrigated lands? Likewise, a resettlement programme may upset the ecological balance, lead to less food production and predispose the population to hunger. Only when integrated plans are made will it be possible to make efforts to contain malaria and bilharzia or seek alternative sources of food supply and ensure maximum benefits from such programmes.

3. Tanzania: Towards A Food and Nutrition Policy

a) Identification of Target Groups

Knowledge of the characteristics of target groups is useful in the planning of programmes and channeling of resources. In terms of physiological state and needs children, pregnant and lactating women are known to be more vulnerable to nutritional problems and special programmes have been developed to meet their needs. However, categorization by socioeconomic criteria is a more demanding task. If we generalize that malnutrition is mainly a problem of poverty, Tanzania with a mean per capita income of less than $200 is a poor nation. Likewise, if we say that malnutrition is found in the rural areas, this group in Tanzania includes 95 percent of the population. Malnutrition will therefore be found where the people are. Differences within regions are often greater than between regions and in the same household one child may suffer from malnutrition and repeated episodes of infection while none of its siblings are affected. The basis for malnutrition is complex.

Even though Tanzania has adopted a frontal development strategy, certain areas of the country require greater attention than others. By agro-ecological zone the semi arid areas stretching across the central zone of the country have lower potential for food production

and have often received famine relief. Such areas require special attention and programmes of crop diversification. In these parts of the country drought resistant crops have been encouraged. Areas of cash crop production are regarded as prosperous in terms of higher incomes and standards of living. Kilimanjaro, amongst the most prosperous regions, was surveyed and the results were unexpected. Twenty-six percent of the children surveyed were malnourished and kwashiorkor was common. A weaning diet based on the staple, bananas, is expected to produce this result. A study of one of the districts in the region revealed that unstable families, high rates of alcoholism and land shortage are some of the socioeconomic factors contributing to poor nutritional status (Swantz, 1975). Kilimanjaro region should be remembered as a land pressure area. So the category of prosperity should not exclude this region in terms of requiring attention; of course a different approach is required. Susceptible to food and nutrition problems are also those areas of recent diversification into cash crop cultivation. Households reach a stage where they are neither producing enough food nor do they attain enough cash for food purchases. Alternatively the cash realisation may not be allocated to food. This has been demonstrated for the Southern Highlands areas of Tanzania where households in such intermediate stages had higher frequencies of malnourished children than those growing only food or fully established in cash crop production (Jakobsen, 1978).

Target groups can be identified on the basis of income necessary to fulfill a nutritionally adequate diet in comparison to actual incomes. Since it is known that food consumption comprises a significant share of total consumption it is possible to derive the extent to which households may fail to attain an adequate diet.

Available information on food consumption precludes analysis of the actual food deficits or the total number of people malnourished in the country. Limited statistics show that the calorie deficit may be 20-30 percent. It is suggested that analysis be extended on the HBS (1978) to determine on a zonal/regional basis the extent of food poverty.[1] Such analysis will include determination of low cost diets typical for the regions and use local retail prices for computing costs. A similar exercise was done for Kenya using a least cost diet of maize and beans and showed that use of national average prices overestimated the extent of food poverty (Crawford and Thorbecke, 1979). Information on household sizes and composition can be obtained from Population Census Data (1978). This will enable estimation of household dietary requirements and the total number of households falling below the food poverty line. Comparisons can then be made with actual food expenditures from HBS (1978) and regional differences mapped out.

An example of determination of a food poverty line is included. A typical low-cost diet for Dar-es-Salaam is estimated to cost

[1] Food poverty defined as food consumption levels below normative minimum standards (Crawford and Thorbecke, 1979).

T. Shs. 2.46 for an adult per day as shown in Table 18. Applying calorie requirements[1] for a household[2] this estimate amounts to T. Shs. 12.40 per day, or T. Shs. 4526 per annum. Note that the total calories supplied by the composed diet is 2497 and the difference with actual requirements is disregarded as these figures are approximations. With the assumptions used in these calculations, a food poverty line of T. Shs. 4526 is arrived at for Dar-es-Salaam and households with less than this amount to spend on food may be considered nutritionally at risk. For such estimates to be useful for policy purposes comparisons have to be made with actual food expenditures and confirmed by consumption levels. Also account has to be taken of all costs that go into attaining an adequate diet. The food poverty line of T. Shs. 4526 can be compared to the income per household which is estimated at T. Shs. 4896 per annum,[3] showing that almost all income of the average family would have to be allocated to food to obtain an adequate diet. Extrapolation from the HBS (1969) showed that approximately T. Shs. 2000-4000 is required for an adequate diet for a household and that about 70 percent of all Tanzanians spent less on food than could fulfill an adequate diet.

Table 18. Composition and Cost of a Typical Low Cost Diet for Dar-es-Salaam

Food Item	Gms/Adult/ Day	Price/kg*	Cost of Diet	Calories Supplied
Maize flour	500	2.00	1.00	1810
Kidney beans (dry)	100	3.50	.35	339
Whole fish (dried)	60	10.00	.60	185
Amaranth	60	5.00	.30	28
Oil	15	14.00	.21	135
Total			2.46	2497

* Retail prices for Dar-es-Salaam as of October 17, 1979.

[1] An energy requirement of 2,400 kcal for an adult suggested for Tanzania is used.

[2] A household of 6 members composed of 2 adults, 2 children <5 years old, and 2 children 6-10. Average household size for Tanzania = 5.6 (1969).

[3] An average family considered to have 1.2 wage earners. Thus a minimum wage of T. Shs. 380 per month would arrive at T. Shs. 4896 per annum for a family (ILO/JASPA, 1978).

b) Institutional Development

The absence of an explicit food and nutrition policy has not deterred efforts in nutrition activities. Such efforts date back to the colonial period. A committee appointed by the British Government to review human nutrition in Tanganyika Territory in 1937 made the following recommendation:

> Improvement in nutrition will result in better health and generally greater resistance to disease; in improved physique and therefore capacity for work and greater output. This is the most important thing to make those concerned appreciate. Improved nutrition is to be a reflection of better farming methods, to which it is related, soil erosion with its causes, shifting cultivation and overstocking. This will not only benefit the natives' agriculture but ultimately determine the prosperity of the territory. It will mean more contented labour on plantations and mining industry, and contented labour brings the best type and an adequate supply of workers. It will reduce the enormous wastage of such labour as now occurs in days taken off on account of sickness, search for food, or lack of stamina to work regularly. Greater output in native and non native industry means more exports with the resultant improvement in the economic and financial part of the territory (Mohamed and McKeag, 1970).

These recommendations were followed by various activities for nutritional improvement emphasizing food production, supply of food to labourers, supplements and education and health measures. It was emphasized then that the basic cause of inadequate diets was ignorance of the value of foods particularly fruits and vegetables.

By 1949 suggestions were made for a Standing Committee for Food Policy that could help in solving nutrition problems. The motives for improvement during the colonial era may have been different, but the means were the same.

A Central Advisory Committee on Nutrition was formed in 1953, drawing its members from different disciplines. Its role was mainly advisory on technical aspects of nutrition. In 1962 when the Freedom From Hunger Committee (FFHC) was formed it took over the functions of the Central Advisory Committee although the FFHC was mainly responsible for organisation of action programmes against hunger and malnutrition.

With increasing concern to tackle the country's nutrition problems the Tanzania Nutrition Committee was formed as a sub-committee

of the FFHC. It was to take responsibility for the formulation of a nutrition policy and initiate and coordinate nutrition activities at national, regional and district levels. It drew up the Nutrition Unit Plan and was responsible for most of the nutrition activities of the 1960's and early 1970's. The increasing number of interest groups saw the need of a central coordinating body which could serve as a lead agency for nutrition activities. This led to the formation of the Tanzania Food and Nutrition Centre (TFNC) by an Act of Parliament in December 1973.

c) A Food and Nutrition Policy in the Making

Among the responsibilities that TFNC is charged with are the planning and initiation of a food and nutrition programme for the country, advise the government on matters related to food and nutrition, and promotion of awareness of the problems and consequences of malnutrition. Particularly relevant to food and nutrition policy is the task of collaboration with the Ministry of Development Planning to formulate plans relating to food and nutrition for the benefit of the country's population. These plans are for incorporation in national development plans.

Two elements favourable for nutritional improvement exist in Tanzania. First, there is awareness and second the political atmosphere is favourable. Policy statements related to improvements of health, food and nutrition have featured in major government campaigns, plans and addresses. The President himself, a strong advocate of nutritional improvement has made several key addresses regarding the issue. Introducing the Second Five Year Plan to Parliament in 1969 in his address, "To Plan Is To Choose," President Nyerere elaborated on how a hungry person weak of body and of mind could not bring development, the special needs of children are emphasized concluding that a good diet and nutritional improvement are basic to progress in the country (Nyerere, 1973). These are statements of intent to tackle the problems of hunger and malnutrition.

Since its formation TFNC has prepared ground work for drawing up a national policy for food and nutrition. Its existence saw the drawing up of the Third Five Year Plan for Economic and Social Development. It was not possible at that stage to make serious sector analyses or to determine how they would contribute to nutrition. However, it is clear that in all three plans objectives for improved health, increases of income and better standards of living feature high. With almost two decades of such development efforts malnutrition remains rampant. Time may have been too short to reap the benefits of these efforts but also some of the strategies for solving nutrition problems may have been wrong. More important, the broad statements of intent may not have been matched with sufficient action to deal with the huge problem of malnutrition.

In its draft proposal for a food and nutrition policy, TFNC has made an aggregate analysis of the country's food and nutrition situation.

Issues are raised for consideration in each of the relevant areas. As an institution TFNC could not draw up a policy single-handed because many different sectors are also involved. It is now almost two and a half years since the original draft was circulated. Progress has been rather slow although TFNC has discussed and influenced major decisions in the area, e.g. the New Food Law enacted in 1978. If the role of TFNC in such policy formulation remains merely advisory and for coordination, then it is unlikely that it can undertake the kind of detailed analyses, formulate the needed strategies and conduct evaluations that may be essential for a viable policy.

Elsewhere it has been proposed that there be a separation of the primary planning activities with consultation and coordination as a desirable approach (Beaton, 1975). It seems favourable therefore that consultation at the planning stage be undertaken at the time of preparation of Sectoral 5 year plans and at the time of revision and before implementation of annual plans.

I have in several places acknowledged the idea of analysing other sector plans and policies for their nutritional implications. That is the task I attempt in the following section.

THE ROLE OF GOVERNMENT POLICY IN SOLVING NUTRITION PROBLEMS

It is difficult to predict the precise outcome of policy measures on the individual, but general observations can be made on the impact of major government actions. There is an interrelationship in the outcome of many government policies, and this may render delineation or conclusions of "which" results in "what" impossible. Our main concern is to see improvement in the quality of life of the population and it matters less which sector contributed most to such improvement. In discussing the influences of government policy on nutrition I have chosen, agricultural, health and income policy for major focus and will briefly touch on other policies as it is impossible to cover all the sectors in sufficient depth. Practically all government policies influence general socioeconomic development hence nutrition. Divisions are made to make discussion easier but it is obvious that the effects are related and different sector policies are not mutually exclusive but rather reinforcing, sometimes even conflicting. Current government policies are based on principles contained in the Arusha Declaration and the following excerpt from the President's Report sums up the situation ten years after its inception.

> Ten years after the Arusha Declaration Tanzania is certainly neither socialist nor self-reliant. The nature of exploitation has changed but it has not been altogether eliminated. There are still

> inequalities between citizens. Our democracy is imperfect. A life of poverty is still an experience of the majority of our citizens. Too many of our people still suffer from the indignities of preventable disease and ignorance, and the aged and disabled do not all live in decency or even security despite the clear statement in the Declaration that they have the right to support. Further, our nation is still dependent upon the vagaries of the weather and upon economic and political decisions taken by other people without our participation or consent. And this latter is not a reciprocal situation. Tanzania is still a dependent nation not an interdependent one (Nyerere, 1977).

A. AGRICULTURAL POLICY

Nutrition and Agriculture

The attainment of satisfactory levels of nutrition will derive partly from availability of adequate food supplies, a responsibility vested mainly in agriculture. Inevitably, increased food production may not lead to improvement of nutritional status without more just and equitable distribution of means of production. Tanzania particularly after the Arusha Declaration has made efforts to achieve better distribution of land and removal of a class of large land owners. Given the present structure of agriculture where most of the food is produced at the subsistence level, the burden of nutritional improvement relies heavily on the subsistence sector. We have to look therefore at how to optimize the nutritional effects of expanded production possibilities.

An agricultural policy can benefit nutrition in a number of ways:

(1) By increasing food output especially where domestic production provides the dominant share of national supplies.
(2) By increasing rural incomes that are not only essential for other food purchases but also for meeting other needs.
(3) By offering possibilities for rural employment leading to poverty eradication through income generating effects.
(4) Through development of agriculture to stimulate growth in other sectors of the economy especially since agriculture provides the major share of the Gross National Product.

Changes in Agricultural Policy

The kind of agricultural strategy determines both whether possibilities for nutrition improvement exist and who benefits from it. There have been major changes in agricultural policy in Tanzania's history. The German rule saw the introduction of cash

crops such as sisal, coffee, tea, cotton and rubber produced on plantations mainly for export. Plantation agriculture used African laborers and European management. There were no plans for the food crop sector which was left to produce on its own initiative. Likewise, during the period of British rule great support and government infrastructure was geared towards the export sector. Marketing, research and credit institutions were established to cater for export crops. The development of commercial agriculture led to a pattern of regional inequalities marked during the 1930's and continuing until independence. Three types of economic regions emerged characterized as:

(1) Areas specializing in cash crop production for export.
(2) Areas surrounding and supplying the export producers and towns with food and other services.
(3) The peripheral areas supplying migrant labor or stagnating in isolation from the territorial economy (Hess, 1976).

Although cash crops had supplemented rather than replaced subsistence agriculture, the main effect was to reduce the land, often the best land, available for subsistence crops.

At the time of independence, Tanzania inherited an agricultural sector that was heavily biased towards the cash crop sub-sector which it tended to perpetuate. Public attention was focused on cash crops to increase foreign exchange earnings and provide the basis for trade. Increased expansion of cash crop acreage rarely led to increases in yields but it led to economic dependence and the nation had to bear the extra costs of food imports. Soon, however, it was realized that if agriculture made the greatest contribution to national welfare, a policy that would foster self-sufficiency in food and at the same time supply export crops, with involvement of the people as owners of the means of production, was necessary. Tanzania had by 1967 opted categorically for a course of development entailing socialism and self-reliance. The organization of people into villages and the principle of cooperative production are two of the features of this policy. The Party Central Committee Meeting of May 1972 placed further emphasis on the country's agricultural policy (TANU, 1972). The ability of the nation to feed itself is vital to success in the country's development efforts and it has been emphasized that there is no use talking about socialism and self-reliance if Tanzania could not use its own resources of land and labor to produce the basic food stuffs to feed the nation.

Policy Options for Increasing Food Supply

Policies are necessary to balance food supply and food demand. Implicitly a food policy is geared to the provision of an adequate diet at a reasonable price compatible with good nutrition and health. In order for consumer interests to be met, there is an obvious need for a food policy not to be determined independent of a nutrition

policy. In many instances however, economic and political considerations rather than nutritional and health considerations have weighed heavily in determining national and international food policies.

Available options for increasing total supply are rather limited and a country may choose amongst increasing domestic production, increasing levels of import or increasing dependency on food aid. Given the gaps in projected production compared to demand, development efforts have to emphasize policies that will lead to improved performance in production. Invariably, these will require large investment in the agricultural sector. Increases in production will essentially derive from use of technologies complementary to labor and the major introduction of capital intensive technology is an undesirable strategy for Tanzania where the absorptive capacity for labor outside of agriculture is very limited.

It is obvious that food aid cannot be used to solve the country's food problems; it can only be used on an emergency basis. It is therefore not recommended as a viable policy option for increasing the country's food supply. Some of the negative effects of food aid include suppression of domestic food prices, leading to a possible disincentive for local production. The maintenance of supply levels is entirely controlled by the donor country. Food aid may lead to a degree of unwarranted relaxation in national efforts and in Tanzania it is clear that this is not what we want. If food aid is a surplus disposal program, it is unlikely that it can be maintained in periods of shortages.

Self-sufficiency in food meaning increasing levels of domestic production is a major goal of Tanzania's agriculture. The need for all people to be well fed as a prerequisite to good health and increased productivity has been realized. Uncertainties of prices, availability of food from exporting countries, coupled with the experience of unreliable export earnings would subject the country to an intolerable level of economic risk. While years of surplus export crop production may suppress prices of our exports, depression in food production may force prices up and make it difficult for us to purchase sufficient food. If domestic food production through labor intensive methods will also generate more employment, then a shift to greater levels of self-sufficiency in food is a sensible development strategy.

Agriculture in the Third Five Year Plan

As outlined in a previous section, national food production has not achieved its targets. Already in Second Five Year Plan (July 1969 - June 1974) the objective of attaining self-sufficiency and of having a surplus for export in maize and paddy was set. Mellor (1966) suggests that most agricultural development programs fail because the general strategy is not conducive to their success.

Problems facing the attainment of objectives in the Second Five Year Plan besides the natural catastrophies of poor weather are suggested. These include the lack of production plans for food crops, inadequate investment and the problem of rising costs of agricultural inputs (URT Third Five Year Plan). The strategy was not favourable to increases of food production. Although there has been increasing emphasis on the use of agricultural inputs for food production, it is reported that in 1975 most fertilizer was used for cash crops, except for twenty percent that went into maize production (ILO/JASPA, 1978).

With national production targets not met, the first issue of increasing supplies as a means of improving nutrition was partly thwarted. When it comes to income increasing effects, we see that agricultural productivity in Tanzania is relatively low. Estimates show that the agricultural population has an output per economically active participant only one-sixth the average of other sectors (URT, 1978).

A gross change of investment priorities is required to achieve goals of self-sufficiency in food and these have been taken into account in the Third Five Year Plan. The prime objective remains the attainment of self-sufficiency in major food items. Targets for production have been set apparently with a view to optimizing nutritional effects as shown in Table 17. It appears, however, that the production targets are the same as demand targets in which case there is no allowance for shortfalls in production. By 1981 which is the end of the plan period, it is envisaged that for the major cereals, only wheat production will not meet demand targets. This will require importation of 50,000 to 60,000 tons of wheat by that year.

In the discussion of domestic food supplies, the National Maize Project and production plans for sorghum and millet were mentioned. Both receive emphasis in the Third Five Year Plan. The National Maize Project aims at an incremental production of 195,000 tons of maize by 1982. An appraisal of the project had singled out delayed input distribution, poor infrastructure and lack of effective management as some of the problems the project has to overcome (IBRD, 1975). The problem of untimely distribution, particularly of fertilizers, has been reflected in other discussions (TFNC, 1978). Present recommendations for herbicides may not be suitable for mixed cropping patterns where maize is intercropped with beans (Fortmann, 1976). Since this is a large scale project caution should be taken not to upset the traditional cropping patterns, i.e. the reduction in bean production which may have undesirable nutritional consequences.

The National Agricultural Development Programme is giving increasing attention to the expansion of sorghum and millet production. These cereals are drought resistant and therefore suited to the drought prone areas of the country. Sorghum and millet are used

in traditional weaning foods, and feature in the diets of newly delivered mothers and convalescents in a number of regions. Undoubtedly their nutritional importance must have been recognized. However these cereals no longer occupy a prestigious position and even in semi-arid areas the preference is to grow maize. In areas receiving food famine relief godowns have been known to have large stocks of sorghum and millet, which end up as animal feed or are used to brew local beer. For as long as the country suffers from food deficits this situation is deplorable. New varieties have been developed and attempts made for processing and packaging as is done for maize. As production efforts continue measures had to be taken to promote consumption. A promotional campaign for sorghum and millet was launched in 1978 with members of Parliament as the first target. Since these are representatives of constituencies they would take the message to their areas and promote both production and consumption especially in those areas most suited for production of sorghum and millet.

Among strategies to be adopted to ensure adequate supplies are the following:

(1) The development of an early warning system to predict the food supply situation. This should entail the need to set trigger levels for stocks at which point extra efforts are made to mobilize resources before a crisis situation sets in.

(2) Government subsidy on inputs. This has to ensure also that the mechanism for timely distribution of inputs is available.

(3) Improving storage for the whole country emphasizing village level storage where most of the food is stored. Tanzania loses up to thirty percent of its harvested crop through poor storage (IBRD, 1974).

(4) Increased research on food crops.

(5) The institution of minimum hectarage of food crops for households to differ according to agro-economic zones. This will ensure a certain degree of ability for each household to feed itself.

(6) Participation of parastatal organization in food production on a large scale especially where increased production can be attained at minimum cost. This should not be taken to imply that the government is monopolising the food production sector and pushing aside the subsistence farmers.

(7) Support services through extension that will broaden participation in rural growth.

(8) Offering producer prices that are conducive to increased production. The stability and certainty of agricultural prices influence

incentives for increased output and an agricultural price policy is a method of influencing the allocation of resources for achieving society's objectives of growth and equitable distribution of income.

Animal products play a much smaller role than cereals and starchy foods in most Tanzanians' diets. Nevertheless, they should enter consideration in the planning of overall food supplies. The targets in the Third Five Year Plan are as set out in Table 19.

Table 19. Projected Demand for Livestock Products

	1972		1981	
	'000 metric tons	Consumption/ capita (kgs)	'000 metric tons	Consumption/ capita (kgs)
Beef	106	7.7	188	10.5
Goat	15	1.1	44	2.4
Sheep	12	0.45	not available	
Pig	60	0.08	184	0.125
Poultry	-	0.8	26	1.4
Milk (liters)	483	39.8	972	53.5

Source: URT Third Five Year Plan for Economic and Social Development, July 1976 - June 1981.

As is obvious, it is stated that the demand for beef will depend on livestock prices and consumer incomes. In the calculations of food balance sheets we show that the per capita availability of beef during the year 1976/77 was only 8.6 kgs. So to arrive at a consumption, leave alone the availability of 10.5 kgs. by 1981, will require major efforts. The same may be said about milk. The availability of milk has been declining from the 1972 levels and with the statistics available, it is indicated that only about seventeen litres were available per capita in 1976/77. To set consumption targets of 53.5 litres per capita for 1981 may be too ambitious.

B. HEALTH POLICY

Traditionally, it is the health sector that handles the malnourished when malnutrition manifests itself as disease. The various health facilities treat severe cases and rehabilitate the recovering, but are unable to deal with the mild-moderate forms which never come to hospitals. Budgetary allocation for health care falls under the Ministry of health but the efforts of the health sector are only complementary to those in other sectors. Since it is the health care system that has been faced with the burden of handling the malnourished, its commitment to the cause of nutritional improvement is

pivotal to the stimulation of activities in other sectors as it can demonstrate how its efforts are being frustrated.

The relationship between nutrition and disease has been examined in an earlier section. Suffice it to say here that nutrition has a direct bearing on health and that malnutrition has been contributing to the illness and death of vast numbers of children in developing countries.

Health Care and Nutrition Improvement

Discussing appropriate health care systems to improve nutrition in developing countries we had the opportunity to review health policies of a number of countries.[1] We agreed then that if health care systems have to contribute to improved nutrition, a number of aspects enter into consideration.

(1) Nutritional objectives have to be incorporated in health plans. This requires that those responsible for delivering services are cognizant of the importance of good nutrition to the maintenance of good health. The education of health workers must therefore be oriented to this need.

(2) Severe health problems are found in deprived segments of the population. Improved health services must reach the needy. This means providing services in the rural areas where the majority live. Planning for facilities must take account of spatial distribution, general access and use.

(3) The determination of priorities, design and implementation of health intervention must enlist the participation of those for whom the services are being provided.

(4) Given the complex etiology of malnutrition, the formulation of health programs aimed at the improvement of nutrition should follow a multidisciplinary and integrated approach.

(5) While health care should meet the needs of all people, special emphasis should be placed on the vulnerable groups. Maternal and Child Health Services offering a comprehensive package are a good vehicle for this.

(6) To help the improvement of nutrition greater emphasis should be placed on preventive services, the exact nature of which will vary according to prevailing health problems.

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[1] International Nutrition - Problems, Policy and Programs Group on Appropriate Health Care Systems to Improve Nutrition in Developing Countries, Fall 1978.

(7) To improve nutrition, medical practice and research must be community oriented. Rendering of services will be done mainly by health auxiliaries and other intermediate cadres.

(8) The eradication of poverty, improvement of living conditions, better environmental sanitation and overall improvement of socioeconomic status are all important for better health and nutrition. In many cases this requires re-orientation of priorities which is a political decision (English et al., 1978).

Tanzania's Health Policy

Current health policy in Tanzania is conducive to nutritional improvement. It is geared to the provision of services to all people by expanding the infrastructure, improving the quality of services rendered, and offering free medical care. Greater emphasis is placed on preventive rather than curative services. The structure of health services is comprised of Consultant Hospitals, Regional and District Hospitals, Rural Health Centres and Dispensaries. The high morbidity and mortality from preventable diseases including malnutrition have increased concern for the health of the nation.

In both the First and Second Five Year Development Plans objectives were set to relieve the population of the burden of chronic infections and preventable disease. The need to achieve a balance between preventive and curative services and place emphasis on rural health centres and dispensaries rather than large hospitals was spelled out. It was recognized that given the country's resource constraints, health auxiliaries and rural health cadres are vital to to realize the country's health objectives.

During the First Five Year Plan, the bulk of government expenditure was used in hospitals located in towns. Curative services absorbed the major portion of development funds and so re-emphasis was made in the Second Plan (URT, 1978). The provision of better and more appropriate health services is amongst those accorded topmost national priority.

Tanzania has seen the expansion of rural health facilities as illustrated in Table 20.

We cannot measure the success of a health care system merely by the number of structures put up. But Tanzania has also expanded training of rural health cadres, including Maternal and Child Health Aids, has an extensive vaccination program and health education campaigns. The development of a comprehensive MCH program has much to offer to nutritional improvement. This program now provides the broadest contact between the vulnerable groups and the health care system. It offers services for mothers, treats, immunizes and follows growth of children with the "Road to Health Chart." It provides a focus for targeted nutrition intervention and the package includes

also nutrition education and food distribution to the malnourished. It has been criticized that food distributed in the clinics has other beneficiaries apart from the intended children. What may not be appreciated is that the malnourished child is a member of the family. If family food needs are not met it should be expected that food from the clinic will not be used by the child alone. The nature of the products (e.g., dry skimmed milk and oil) contributes to such acts of sharing. Because of its broad coverage, the MCH service is a useful tool for nutritional surveillance.

Table 20. Medical Facilities in Tanzania

	1972	1974	1975	1976
No. of Hospitals	139	N.A.	129	141
No. of Hospital Beds	17,875	N.A.	18,444	19,960
Population/Bed	804	N.A.	813	794
Rural Health Centres	105	129	152	161
Pop./Rural Health Centres ('000)	129	112	99	99
Dispensaries	1,491	1,670	1,847	2,098
Pop./Dispensary ('000)	9.1	8.7	8.1	7.5

Source: TFNC Data Report, 1978.

From present records such information as changing patterns of morbidity, seasonal variations of dominant presenting forms of malnutrition, regional variations, morbidity of pregnant women over time, etc., can be generated.

The Third Five Year Plan has emphasized further the distribution of health facilities in the rural areas, strengthening of services and emphasis of preventive care.

> It is apparent that Tanzania has now planned for a health care system consisting of rural health centres and dispensaries around district hospitals. The key manpower for running such a rural based health care system are rural medical aides and health auxiliaries. It provides basic health care for the population at the lowest possible level to everyone and it is the one the country can afford (Chiduo, 1978).

With the kind of health policy that the country has adopted there is scope for the nutritionally vulnerable to have reasonable access to health services.

C. INCOMES POLICY

Income and Nutrition

Various relationships hold between income and food consumption. At low levels of income a great proportion is allocated to food, often upwards of seventy percent. Most of the increment to income is also allocated to food, that is, the income elasticity of demand for food is high. At higher levels of income, there is greater diversification of diet, not necessarily implying that the most nutritionally valuable items are added. Income levels and income distribution are used to estimate food intakes and for determining threshold income levels below which individuals cannot fulfill an adequate diet (see, for example, Reutlinger and Selowsky, 1976).

The absolute lack of income rather than inability of its allocation is regarded as the primary cause of malnutrition amongst the poor. The question that is asked in connection with this is whether increases in income will necessarily lead to nutritional improvement. Decisions to use additional income are very personal, and each person has his or her own immediate needs which they particularly wish to fulfill. That increases in income will lead to nutritional improvement, is based on the assumption that increasing purchasing power will see expenditure patterns favorable for nutritional improvement (Barg, 1973). The lack of any guarantee that income increase will be spent on food is not an excuse to shelve efforts geared towards raising levels of income. It is more acceptable for one to be an active participant in the production process and have the means to acquire his own food rather than fulfill this basic need from a massive food distribution program. An incomes policy should aim to increase the purchasing power of the population so that they can fulfill nutritional needs.

Income and Food Consumption in Tanzania

No detailed studies have been made relating income and food consumption. Information analysed from the Household Budget Survey of 1969, provided indications which are used with caution, since the survey was not well designed to collect information on food consumption. For the lower income groups it showed that expenditures on cereals are increasing with income increase. Whereas starchy roots seem not to increase, the meat group shows dramatic increase. There are rapid increases in consumption of soft drinks and alcoholic beverages at rather low income levels. This is where nutrition or consumer education can play a role in guiding decisions for financial allocation.

Currently information is being analysed from the Household Budget Survey completed in 1978. In this survey, food consumption records were kept for fifteen days and repeated four times in different seasons of the year. With the general socio-economic and budgetary

information from the survey, relationships of income and consumption can be mapped for different zones of the country.

Tanzania's Incomes Policy

A searching review of Tanzania's incomes policy, achievements and shortfalls is contained in a recent mission report to Tanzania:

> The slow rate of growth, the realization of the dangers of relying on foreign capital, the increasing contradictions among the various income classes and sectors, the emergence and dominance of an indigenous elitist class and other factors necessitated and led to a searching reassessment of a stable and fair social order and its strategy and instruments of socio-economic development (ILO/JASPA, 1978).

Several measures were taken after the Arusha Declaration that could lead to income redistribution. These included nationalization of industrial and commercial assets and urban property, fiscal reform, control of consumer goods prices, agricultural prices, wages and salaries. Nationalization has helped in the elimination of higher level incomes and ensuring that the inequalities that were characteristic of the colonial period do not re-emerge. Through progressive income tax, high and medium income levels are taxed more heavily than low income levels. Re-distribution of income has also been done by re-directing expenditure into social services like health and education favoring more the rural areas.

With the measures it has taken, the government has managed to narrow the wage gap between employed or salaried workers. Government wages have increased steadily though unmatched by the tremendous increases in prices.

The gap between incomes of wage earners and peasants has increased, as illustrated in Table 21. Peasants' incomes could increase through increasing agricultural productivity, but as we have seen this has not been the case. Tanzania is still faced with the challenge to expand opportunities for more productive employment and higher incomes for a growing work force as the vast majority of new additions to the labor force will have to be absorbed in the rural sector.

The income situation in Tanzania could have been worse today without the above measures, yet great efforts have to be made to improve the quality of life of the majority. The eradication of poverty has to be seen not as an issue of public welfare expenditure and redistribution of income, but as a function of the structure of growth. This entails a focus on increased employment and greater participation of the poor in economic growth rather than redistribution of existing output (Mellor, 1976).

Table 21. Incomes and Income Gap 1964, 1970 and 1973-75
(T. Shs. per annum per family)[a]

	1964	1970	1973-75
(i) Average wage family[b]	3331	4798	7160
(ii) Average farm family total income	1847	2633	3917
(iii) Average farm family cash income	796	825	1100
(i) : (ii)	1.8	1.8	1.8
(ii) : (iii)	4.2	5.8	6.5
Absolute total gap	1484	2165	3243
Absolute cash gap	2535	3973	6060

[a] A family is estimated to have 5.6 members.

[b] An average wage family has 1.2 wage earners.

The figures are used to give an order of magnitude, using income as a measure of standard of living. The table shows that on an average a farm family in Tanzania had a standard of living just over one-half of that of an average wage earner's family and the absolute gap has widened considerably.

Source: ILO/JASPA, 1978.

D. OTHER POLICIES

1. Price Policy

The prices of most consumer items, including food, and producer prices for agricultural commodities are controlled by the government. During years prior to 1973 producer prices for food crops had stagnated, accounting partially for the increasing income gap between wage earners and farmers. The government has since tried to increase the price of agricultural products by offering better terms to farmers and increasing their purchasing power. Table 22 shows trends in producer prices for selected food crops.

The price policy is aimed to ensure a fair price for farmers while maintaining reasonably low prices for consumers. The selection of food for consumption is not only influenced by tastes and preferences, it is heavily influenced by the prices of food and other commodities. The consumer price index for food has been rising faster than for other commodities. It was highest during the first quarter 1977 = 275.7 (Base 1969 = 100). The comparable index for all commodities during that quarter was 234.3. Cereals and cereal products have

Table 22. Producer Prices for Selected Food Crops (Tanzania Shillings per kg.)

Food crop	Price per kg. 1974/75	1975/76	1976/77	1977/78	1978/79
Maize	0.05	0.75	0.80	0.85	0.85
Paddy	0.65	1.00	1.00	1.20	1.20
Wheat	0.77	1.00	1.20	1.20	1.25
Finger Millet	0.55	0.85	0.95	2.00	2.00
Bulrush Millet	0.55	0.75	0.90	1.00	1.00
Sorghum	0.55	0.75	0.90	1.00	1.00

Source: TFNC Data Report, 1978.

however remained cheaper compared to other food groups. One of the factors accounting for high consumer prices are the high costs of processing and marketing. A calculation based on the price build up from procurement from the farm to the retail price the consumer pays shows that for the year 1976/77 transport, processing and distribution costs made up 58 percent of the consumer price for maize, 56 percent for paddy, and 62 percent for wheat. If consumer prices have to be kept low then efficiency in handling and distribution is required. The government has realized this and some of the measures taken include the reorganisation of crop purchasing authorities. Possibly also the storage and processing of food closest to production areas will help cut down on costs.

Discriminatory pricing of food commodities has been suggested as a useful tool to ensure that food consumed by the majority (comprising the core diet which is nutritionally satisfactory) are relatively cheap. This obviously requires government subsidy and depends on government's ability to raise revenue from other sources to pay for such consumer subsidies. As estimated for Tanzania only 15 percent of the major grains enter commercial channels. If the government subsidises maize meal heavily who will benefit most? If such benefits will accrue to the wage earners this means that their purchasing power will be increased. Without similar measures for the peasants this mechanism may widen further the purchasing power gap between wage earners and farmers.

Can price policies be used as a tool in adjusting tastes and preferences away from a high consumption of certain foods like meat and other animal products where prices are high? But this is not likely to be the reason. Using meat as an example, we see that prices have soared partly due to increasing production costs, but also the marketing margins between the farmer and the butcher are known to be very high and they are made worse by middlemen. The challenge that Tanzania has to face is that through its education campaigns it has

created demand for certain foods. Certain restrictions against foods have been broken, e.g. for eggs, and people have been made aware of the importance of balanced diets. Some of the additions to their ordinary diets are the very foods that are very expensive. Undoubtedly such creation of demand has to be matched with increasing production efforts and availability at such prices that people can afford. Most of this effort is expected from the people themselves.

2. Import Policy

Where the country spends resources for food imports then items may be selected on the basis of nutritional value apart from the need to satisfy popular demand. Tanzania's shopping list for food is long; it ranges from basic staples like maize and rice to butter, cheese and infant formulas. Tanzania is not worse than many other developing countries in the area of bottle feeding and a large number of children are still breastfed into the second year of life. The fact that imports are centrally controlled, an import policy could be used as a regulatory mechanism for the import of infant formulas whose popularity is increasing particularly in the urban areas. Considerable funds are being spent on the import of formulas. As an illustration are the import figures for the major infant formulas. In 1977 a total of T. Shs. 14,995,960.70 was spent to import Lactogen, Nan, S26, SMA, Mamalac and Similac which are the leading proprietary brands. This may be little money in a multimillion shillings national budget. Compared to health expenditure however, we see that for the year 1976/77 the Regional Health Development Expenditure for Preventive Services was only T. Shs. 3,598,000, a mere 24 percent of what is spent to import infant formulas. Yet the problems resulting from the improper use of these formulas are large, and many victims of bottle feeding end up in the hospitals increasing the cost of health care. The recurrent cost of curative services is many times more than what is spent on imports. For 1976/77 the Health Recurrent Budget amounted to T. Shs. 136,308,240. This is not to say that the importation of the formulas is the main cause of the problems, but if within our import policy we can use some discriminatory mechanism to prevent some of these problems, why not? We are confusing the public if a nutritionist in one office condemns the use of formulas due to its effects on health and the precipitation of malnutrition, and three blocks away orders are being signed for massive consignments of Lactogen from Nestle.

3. Education Policy

The education system can be used as a vehicle for nutrition education and through it interventions such as school feeding and school gardens can be executed.

Tanzania's policy of Education for Self Reliance entails preparation of children for a better life in the villages and also mass

adult education. Education for Self Reliance includes elements of production and in ecologically suitable areas schools are producing food. There are many cases where this food is sold to boost school funds rather than to feed the pupils. Based on earlier trials on school feeding, the Ministry of Health had recommended in 1962 that school lunches be provided in primary schools. This programme had relied heavily on food aid. By 1972 it is reported that school lunches were being provided in all regions and that 200,000 children were being reached (Sarakikya, 1978). The Primary School enrollment for the same year was 1,003,396, meaning that only about 20 percent of the children were covered. Since most of the children would go to school without having eaten anything at home, many still walk long distances, and not all parents can afford a meal for their children to take to school, the area of school feeding should receive emphasis. Such a programme can be executed through self-reliance and collaborative efforts between school authorities and parents. Most of the schools where school feeding is viable have used this mode.

The mass education programme has provided good grounds for nutrition education. The food and nutrition campaign, "Chakula ni Uhai" of 1975 mainly used channels of adult education where the media, discussion groups and teaching primers written around the subject of food and nturition were used in combination. The place of nutrition education within the formal training system is being reviewed and the curricula of various institutions like secondary schools, agricultural and health institutes would have to teach nutrition in a manner compatible with current thinking and national needs.

School health services is an area of collaboration between health and education authorities and may have worked more successfully in the big towns than rural areas.

E. SPECIFIC PROGRAMMES OF THE TANZANIA FOOD AND NUTRITION CENTRE

TFNC's approach to the problem of malnutrition is interdisciplinary and has a major component of village level activities. At the same time, it provides support to regional and district planning and plays the role of a national coordinating institution. The Centre has no extension staff of its own and therefore operates through established cadres mainly of the ministries of health and agriculture and the regions. In the Centre's five year plan in conjunction with all other national programmes, the target is to reduce malnutrition by 30-50 percent in all the regions by 1981. The main programme areas in which the Centre is involved are described below. Systematic and continuing evaluation is included in all programmes.

1. Data Collection and Analysis

Emphasis has been placed on the improvement of availability

of valid data on the food and nutrition situation in the country. All available information has now been systematically compiled and analysed where possible. This information has been disseminated to all relevant institutions and can be used to guide the choice of effective measures against malnutrition. In collaboration with the Bureau of Statistics the Household Budget Survey 1977/78 has collected food consumption information in such a way that relationships between consumption and socioeconomic variables can be studied. The programme will continue to update information on food and nutrition and is carried out in cooperation with the Ministries of Agriculture and Health, the Bureau of Statistics, the Regions and all institutions conducting studies or research related to food and nutrition.

2. Food and Nutrition Planning

Through this programme the Centre initiates and supports nutrition planning activities from village through national levels. Groundwork for a national food and nutrition policy has been laid. Regional Integrated Development Plans have been reviewed for their nutrition components and guidelines have been provided to ensure that nutritional implications of development plans are realised. At village level emphasis has been placed on the planning of agricultural production targets to meet nutritional needs. Lately a short course on food and nutrition planning for regional officials has started, to ensure the place of nutrition in overall planning. The success of this programme relies on the cooperation of the Prime Minister's Office, Ministry of Finance and Development Planning, Sectoral Ministries and all regions.

3. Food Storage

Emphasis on proper food storage has two main objectives, to make more food available through minimizing storage losses and to prepare for possible production increases. This programme has therefore been launched to study and improve traditional storage methods especially for grain cereals. Village level storage receives priority since most of the food is stored on the farm. The agricultural sector is mainly involved.

4. Food Development

Tanzania has been importing cereal-based weaning foods like Cerelac and Farex. The search for a locally available, cheap, commercial weaning product led to the development of a product, LISHA; it is composed of 65 percent maize, 28 percent full fat soya flour, 5 percent dry skimmed milk, and 2 percent vitamin-mineral premix. It is an extrusion product using the Brady Low Cost Extrusion Cooker. At present production levels it can substitute only a small fraction of the imports. Initially this product was distributed in clinics but plans are for commercial sales.

Parallel efforts have been undertaken to improve the homemade weaning foods. Whereas the National Milling Corporation is helping in the production of LISHA, the MCH clinics, Women's Organisation and the regions have been involved in the promotion of better weaning diets.

5. Food Standards and Industry

This Programme aims at safe and nutritious food production and marketing. As a result of earlier efforts the Parliament passed the Food (Control of Quality) Act in April 1978 in which the Ministry of Health and Judiciary collaborated in preparation. The implementation of the new law will succeed with the cooperation of consumers and the general public and various institutions. These include the Ministry of Industries, food manufacturers, the Bureau of Standards and various departments of health including the Central Chemical Laboratory.

6. Training and Education

Formal training in nutrition and the raising of the level of nutrition knowledge for extension staff and the general public are emphasized. The programme provides support for nutrition oriented services to educational institutions including school feeding. Training institutions in health, agriculture and education are involved and their curricula are being reviewed to include nutrition as is now understood. The Institute of Adult Education plays a significant role in nutrition education of the public.

7. Food and Nutrition Surveillance

The Joint FAO/UNICEF/WHO Expert Committee on Methodology of Nutritional Surveillance recommended to national governments in 1975 that "Nutritional surveillance systems be established as a matter of priority, be multi-sectoral in nature and function at the regional and local government levels and be primarily concerned with the vulnerable groups."

Tanzania has been testing an early warning system for maize and indicators are being tested for a broad surveillance programme. A regional surveillance programme will start in Iringa region. Emphasis is being placed on improvement of channels of communication and such information will be collected as can guide policy decisions. Analysis will mostly be carried out at the local level. The Ministry of Agriculture, National Milling Corporation, Meteorological Department, Marketing Development Bureau, and MCH services are all cooperating.

8. Food and Nutrition Surveys

A number of surveys have been conducted mainly at village level and tied to specific projects which have nutrition as a component.

These have helped to give an increasingly better understanding of the forces associated with malnutrition. Large scale general surveys are not encouraged.

9. Applied Nutrition Projects

This gives room for the support of nutrition projects at district and village levels. An integrated village nutrition project is now running in a number of villages involving health services, food production planning, storage, nutrition education. Such projects are run by the villages and districts and TFNC provides necessary support and technical guidance.

10. Nutrition Research

This programme includes the study of dietary bulk, vitamin A, nutritional anaemias, goitre study, and nutrition rehabilitation. The dietary bulk project is evaluating the relationship of energy density and energy intake in preschool children with a view of improving child feeding. The vitamin A study will ascertain the prevalence of vitamin A deficiency in the country. A study of the causal factors in anaemia will be undertaken. Goitre studies will provide support for the planned project on salt iodisation.

The Centre undertakes many other activities at the request of various institutions and government ministries and is directly involved in policy matters related to food and nutrition which are not programmed.

SUMMARY AND RELEVANT ISSUES FOR EMPHASIS

A. SUMMARY

This study has brought together information describing the food and nutrition situation in Tanzania. PEM is the most serious nutritional problem in terms of numbers affected, its effects on morbidity and mortality and the long term effects it has on the individual. Between 20-30 percent of all children under five years of age are affected by this condition in its various forms and PEM is a cause direct or otherwise of up to 50 percent of all childhood deaths. This form of malnutrition has been accorded priority for solution.

Endemic goitre due to iodine deficiency is common in some parts of the country and the reported prevalence of 75.9 percent in Ukinga Highlands may be the highest in Africa. Iron deficiency anaemia is the common form of anaemia in the country. Dietary intakes of iron may be adequate, but quantities of heme iron are very limited in the diet. The anaemia picture is complicated by the high prevalence

of infections, particularly malaria and hookworm. Vitamin A deficiency has been ascertained as the main cause of blindness in children. Other conditions include fluorosis and deficiencies of B vitamins.

Common to practically all cases of nutritional deficiencies are poverty, poor environmental sanitation, low incomes and wages, absolute lack of food or its maldistribution either in society or households, the multitude of disease conditions and lack of education at all levels.

The food supply situation in Tanzania has been examined. Food is of vital interest to any discussion of health and nutrition as there are many who are inadequately fed. The early 1970's have been bad production years necessitating massive food imports. The conditions have however improved and now the trend is towards increased food availability. Our knowledge of distribution clearly indicates that what is available is not equally shared at all levels. Tanzania's choice is to increase efforts and investment in food production in order to achieve a decent diet for the mass of her people.

Tanzania has had decades of nutrition activities aimed at the amelioration of nutritional problems and like many other developing countries has met little success in the past. Interventions like food distribution, e.g. as famine relief, have been undertaken. To date food aid is distributed in clinics. It will help, but it will never solve the problem of lack of food or its improper use in the homes of the malnourished children. Nutrition education has had women as the target, with cooking lessons and demonstrations as the main feature. These have been conducted in clinics and various community gatherings. The media have been used particularly for educational campaigns. As a measure of direct intervention for school children, the school feeding programme was started and by 1972 it covered all the regions reaching 20 percent of primary school children. Cereal fortification was initiated in 1959 as the consumption of refined cereals became fashionable. Vitamin B and calcium were used to enrich the flour, but the multitude of small mills made enforcement difficult. An applied nutrition project was started in 1965 with district nutrition services including the operation of under-five clinics, where immunisation, growth follow-up and education were conducted. With all these efforts much of the malnutrition problem remained untouched. Isolated, competitive projects did not offer a solution and the country set out to try a more coordinated plan of action and an integrated approach. Thus the Tanzania Food and Nutrition Centre was formed in 1973 to coordinate matters of food and nutrition and provide advisory services to the government and its institutions.

Such an approach to nutrition problems requires a food and nutrition policy which is discussed previously (pages 35-44).

A national food and nutrition policy does not offer all the solutions to nutrition problems, but it may lead to the coordination of an overall development strategy leading to better standards of living, eradication of poverty, improvement of quality of life and social and economic development that will see the improvement of health and nutrition. It has to be a deliberate effort geared to the needs of the majority, for a statement of intent is not enough. Malnutrition is both a cause and an effect of poverty, and as Jean Mayer emphasizes, "A food and nutrition policy involves struggling against poverty itself by attempting to cope with one aspect of poverty: inadequate food for the many" (Mayer, 1975).

All development programmes are executed by sector and the problems of malnutrition are affected by all those, whose responsibility it will be to improve this condition. Malnutrition is everyone's problem and everyone's responsibility. It is the problem of health as the malnourished continue to fill up hospital benches, it is also agriculture's concern as it has to produce the necessary food. Trade is equally concerned as it has to make necessary plans for imports where needed. Whereas socioeconomic policy can lead to increases in income, education has to continue to seek the necessary tools to modify people's spending and eating habits. This makes it necessary that our development plans have the kind of balance amongst all sectors that could lead to nutritional improvement.

The last section examines various sector policies and their implications on nutrition. As indicated earlier, any major national policy influences general socioeconomic development hence nutrition. Past agricultural policies have emphasized export crops at the expense of food crop production. Major changes have taken place and food self-sufficiency is now accorded priority.

Agriculture remains the main source of employment and income but it is characterized by low productivity particularly in the food sector. Tanzania's income policy has strived to bridge the gap between the incomes of the highest and the lowest paid workers. Fiscal measures have been taken toward a more equitable distribution of income. The income gap between wage earners has narrowed considerably, but the gap between wage earners and farmers has widened. One way of dealing with this is to increase farmers' productivity through support services and better prices for their products. The national health policy now emphasizes prevention of disease and the health infrastructure is rural based. It is conducive to nutritional improvement and provides access to services for the vulnerable groups. Price policy, import policy and education policy have been briefly discussed and they all have a place in the efforts to improve nutrition.

B. SOME RELEVANT ISSUES FOR EMPHASIS

A broad range of activities are being undertaken in Tanzania directed at the problems of malnutrition. The following issues are considered relevant to these efforts and are therefore emphasized.

1. Development Policy and Nutrition

(i) Adequate nutrition as a national priority needs the support of all sectors. The Tanzania Food and Nutrition Centre is a coordinating and advisory body and runs some projects. However, the implementation of programmes towards increased food availability, health care, education, etc. geared towards solving nutrition problems remains the responsibility of executing ministries.

(ii) A general state of awareness of malnutrition and its attendant problems has been created in Tanzania. Efforts to bring to the attention of planners and policy makers at all levels, the importance of nutrition to overall development have to continue. TFNC has started organising seminars and workshops for Regional and District officials in this direction and these efforts must be supported.

(iii) Tanzania has decentralized planning and each region is supposed to have a Regional Integrated Development Plan. The nutritional status of the population should be included in the measurement of the achievements of the implemented plans. Likewise, simple nutritional status evaluations should comprise part of the essential baseline data in regional development planning. Most of the currently collected information can serve this purpose and only a few specific nutrition surveys may need to be conducted.

(iv) The release of constraints of hunger and poverty rely heavily on the rate of growth in agriculture which still makes a major contribution to the economy. The agricultural strategy will therefore continue to emphasize increases in rural productive capacity and raise farm household incomes.

(v) Malnutrition is closely related to poverty; an increase in the per capita real incomes of the poor can be expected to result in the improvement of their nutritional status. Relevant to this are the issues of unemployment. Open unemployment is being contained in Tanzania and in the capital city may be growing at the same rate as population growth. Since underemployment characterized by low productivity and low incomes is a more serious concern, the creation of economic activities promoting higher utilization of labour off the farm during off season periods ought to be encouraged.

2. Targeted Nutrition and Health Programmes

While pursuing programmes to improve overall socioeconomic status, direct nutrition and health programmes will benefit a sizeable proportion of the population.

(i) PEM is the condition that commands the greatest attention now. Preventive measures and treatment and rehabilitation of those affected will continue. More attention should also be paid to the

other forms of deficiencies. Improvement of diet and public health measures may help improve iron status. The prevalence of vitamin A deficiency should be ascertained and the distribution of vitamin A capsules to the most affected areas can then be instituted. This will not substitute efforts for dietary improvement.

(ii) Tanzania has a high reported prevalence of endemic goitre (75.9 percent in Ukinga). Plans are now underway for salt iodization. The logistic and distribution problems should be weighed against the benefits that will be derived from the prevention of this condition.

(iii) Food supplementation is a way of reaching the most needy and may be regarded as a form of income redistribution. The weakness of this programme has been its heavy reliance on food aid. Tanzania is now producing a weaning food "Lisha" which is distributed in clinics. At present levels of production the import substituting effects of this product are limited. The government has to continue its efforts to mobilise internal resources if food supplementation should sustain.

(iv) Most interventions are directed at children, e.g. school feeding, food supplementation. Such programmes should regard children not as individuals but members of families and larger communities. Evaluation of such programmes must take into account that where family food needs are not met the effects of such programmes may be mainly substitutive for the child rather than complementary.

3. Information Collection and Dissemination

The ability to execute the right programmes requires that all concerned are well informed and that we keep vigil of the nutrition situation.

(i) Tanzania Food and Nutrition Centre has been analysing information on food and nutrition for the country. The disaggregation of such information by socioeconomic criteria will help identify those areas or groups in need of greatest attention and therefore aid in the channeling of resources to these groups while broad efforts are continuing.

(ii) A nutrition surveillance system is being tried in Tanzania. The establishment of nutrition surveillance activities is warranted because the information collected is likely to affect public policy.

(iii) The role of the community in the improvement of nutritional status cannot be secondary. The village is a wealthy source of information on prevailing conditions. In addition to keeping records on production and other economic data, villages should be encouraged to keep records of deaths of children (although these are known to individual families), outbreak of diseases in their communities, and measures taken to tackle health and nutrition problems. Village health aides can learn to recognize malnourished cases and

help them even before they are brought to the dispensaries. Everybody should take individual responsibility in the improvement of health and nutrition.

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